



Digitized by the Internet Archive
in 2014

<https://archive.org/details/annualreportofne1978newy>



**New York
Zoological Society
Annual Report 1978**



Front cover: The New York Zoological Society conducts cooperative breeding programs to ensure sound captive populations of the large cats. The snow leopards in this photograph are the second and third generations of a maternal line established at the Bronx Zoo.

**New York
Zoological Society
Annual Report 1978**

Contents

Report of the President	5
Report of the General Director	7
New York Zoological Park	12
Department of Mammalogy	12
Department of Ornithology	14
Department of Herpetology	16
Department of Animal Health	18
Department of Exhibits/Graphics	19
Wildlife Survival Center	20
New York Aquarium	21
Osborn Laboratories of Marine Sciences	24
International Field Science and Conservation	26
Center for Field Biology and Conservation	26
Department of Conservation	27
Field Projects Around the World	29
1978 Publications of the Scientific Staff	31
Education	33
New York Zoological Park	33
New York Aquarium	34
Animal Kingdom Tours	34
Departments of Development and Membership	35
Administrative Services	37
Department of Personnel	37
Department of Publications and Public Relations	37
Visitor Services	38
Operations	39
Security	39
Report of the Treasurer	40
Audited Financial Statements	42
Board of Trustees and Committees of the New York Zoological Society	48
Staff of the New York Zoological Society	50
Contributions	51
Gifts-in-Kind	52
Recommended Form of Bequest	52



Above, Grevy zebra at the Bronx Zoo. Below, conceptual drawing of the new exhibition facility for rare African mammals. When it is opened in 1981, giraffe, zebra, and another endangered species such as the okapi may be seen year-round.

Report of the President

When it comes to fighting ignorance or apathy about the plight of wild places and wildlife, the role of the New York Zoological Society is continually expanding and developing. Institutional growth is demonstrated by many of the vital statistics which tell the story of the Society's work in the year 1978: attendance at the Bronx Zoo and New York Aquarium increased over 1977 to 2,182,638 visitors (1,731,300 at the Bronx Zoo and 451,338 at the New York Aquarium); admissions and earned income revenues grew to \$5,400,000; the circulation of the Society's magazine *Animal Kingdom* increased to 76,000; twenty-one new courses were added to the programs of the education department at the Zoo; and five new curatorial trainees joined the scientific staff in programs sponsored by the National Endowment for the Arts and the National Museum Act. Nineteen seventy-eight growth in all of these areas of program and revenue was the accomplishment of the Society's professional staff of 385 and part-time employees numbering 425.

In addition to the work of the staff in 1978, there was extraordinary activity among the Trustees. Fifteen Trustees served as officers or chairmen of the committees which govern the operation of the Society, while still others have traveled to collect specimens



for exhibition, and all have helped in the fund-raising efforts so important for our survival. In particular I want to thank John Pierrepont, Chairman of the Development Committee; John Elliott, Jr., and John Macomber, Co-Chairmen of the Business Committee; and John N. Irwin II, Chairman of the Animal Kingdom Fund. All of these campaigns will be discussed later in detail, but I would like to emphasize the fact that the Animal Kingdom Fund grew to \$7,100,000 in 1978, representing an increase of 80 percent in the Society's financial reserve since the Fund's inception two years ago. This accomplishment was aided by Animal Kingdom Fund Vice-Chairmen Mrs. Vincent Astor, John Pierrepont, and John Sargent. And it was aided by the seventy-five distinguished citizens, listed in the back of this report, who have endorsed the campaign by becoming members of the Animal Kingdom Fund Committee.

In 1978 there were several changes in the membership of the Society's Boards of Trustees and Advisors. On this subject I wish to record the Trustees' sorrow at the death of John Elliott, Sr., who served the Society as a Trustee, an officer, and an Advisor for twenty-nine years. New Trustees, nominated for membership at the December meeting of the Board, are Richard T. Perkin and Guy G. Rutherford. During the year Peter R. Gimbel and Peter Matthiessen, after having served several terms as Trustees, were elected to the Board of Advisors, as was Sumner Pingree III.

From time to time, the Board of Trustees elects to award the Gold Medal of the New York Zoological Society for extraordinary contributions to man's understanding of wild creatures, for conservation, or for broad philanthropic support of such efforts, so basic to the purposes of the Society. In 1978, the Trustees awarded the Medal to Mrs. Vincent Astor, a member of the Board of Trustees of the Society and President of the Vincent Astor Foundation.

For operations and projects, gifts of \$100,000 or more were received during the year from Mr. and Mrs. James Walter Carter, Mrs. Lila Acheson Wallace, and from the Vincent Astor, Edward John Noble, G. Unger Vetlesen, and Whitehall Foundations. Corporate gifts in excess of \$10,000 were received from the Champion International, Exxon, and H.W. Wilson Corporations, and from the Helena Rubinstein Foundation. Major contributions of services were received from Ogilvy & Mather International and Ogilvy and Mather Direct Response, Inc. The Animal Kingdom Fund received gifts of \$250,000 or more from the Bodman and Charles Hayden Foundations, the L.A.W. Fund, and the Rockefeller Brothers Fund.

To the 100 active members of the Friends of the Zoo, our volunteer docents; to the 175 members of the Society's Women's Committee, who labored under Chairman Mrs. Harmon L. Rummel to increase Society income in 1978; to all of the Society's donor foundations, corporations, and individuals; and to the Trustees and staff of the Society, my sincere thanks.

Howard Phipps, Jr.
President

Report of the General Director

In 1978, a committee of scientists appointed by the American Ornithologists' Union reviewed the status of the endangered California condor and recommended a program of captive propagation for its preservation. Noting that less than thirty condors remained and that urbanization of the condor's range was continuing at an accelerating pace, it proposed that "a large portion of the present population should be trapped and bred in captivity ... [and that] ... propagation should be continued long enough to produce at least 100 second-generation or third-generation offspring for release to the wild." In effect, the committee proposed the creation of a gene bank: an "ark."

The need for zoological parks to act as "gene banks" is relatively new, while the necessary technology is complex and the space

Frosty, a female, is the second polar bear to be born in New York. The first was Snowball, born at the Bronx Zoo in 1975.



and support requirements demanding. Nevertheless, the acceptance of such a task is a new recognition of responsibility for the earth's other creatures. The several new wild animal breeding farms—such as the National Zoological Park's Front Royal and the Zoological Society's Wildlife Survival Center on St. Catherine's Island, which was made possible by the Edward John Noble Foundation—are remarkable new experiments in human concerns wherein man converts some of his own living space for the use of other creatures. This is happening at a time when he is converting their space to his use so rapidly that less than 2 percent of the earth's land is expected to remain in wildlife reserves by the end of this century. An overview of all Society programs concerned with wildlife was the subject of my 1977 report. Long-term propagation of wildlife is the focus of this one.

Gene Banks

Gene banks have a directness and immediacy that offers an attractive reinforcement to the complex geo-political tasks of habitat preservation. While pretending no overall cure for the epidemic of extinction, captive propagation could provide another way of fighting the continuing reduction of the earth's diversity—an opportunity to preserve options.

Nearly one-twelfth of all the species of birds and one-sixth of the mammals have been bred in zoos in the past two years. At the same time, the continued decline and population fragmentation of large, conspicuous animals, combined with the availability of new techniques in wild animal husbandry, have led to more manipulative approaches to species preservation (see "A Different Kind of Captivity," *Animal Kingdom*, 82 [2]: 4-9). For some animals the only immediate hope of survival is in captivity.

While the concept of captive gene banks and release to the wild from them is encouraged by recent advances in animal care, it is challenged by inadequate existing facilities and socio-economic mechanisms—and by disappearance of the "wild." Ideally, gene banks could fulfill three functions in biological conservation: as substitutes for wild populations in the development of care and management techniques; as demographic and genetic reservoirs for isolated and depauperate populations of wild animals from which infusions of "new blood" may be obtained or new populations founded; and as homes for species that have no immediate opportunity for survival in nature.

Once a species is obtained, maintaining it relatively unchanged over long periods is the heart of the gene-bank task. With little planning, several zoos already have maintained small herds of ungulates in isolation for fifty to seventy-five years, and there are instances of isolated herds which have existed even longer in a semi-free-ranging state. Only occasionally, however, have animals sustained themselves where their populations were not permitted rapid expansion. Of course, serious attempts to maintain wild animals on a long-term basis are—with the exception of the much noted Pere David deer, European bison, and Mongolian wild horse—of very recent origin. In consequence, little is known of the characteristics of captive-animal populations compared to those in nature. In gene-

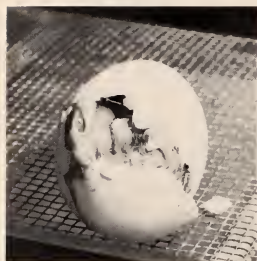
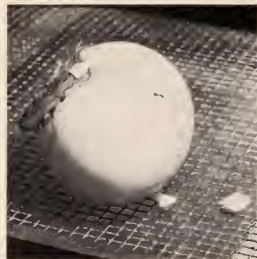


Seven of these endangered white-naped cranes were hand-reared at the Zoo in 1978. Right, adults continue to breed when the first hatchlings of the season are hand-reared. Above, the last hatchlings of the season are reared by the parents.



bank planning, however, it is reasonable to assume that minimum critical population sizes in captivity can be much smaller than in nature.

Disease, competition, successional changes, and predation are protected against in captivity. While this insurance makes its subjects vulnerable to random biological events, such as genetic drift and pressures for selection for atypical characteristics, gene-bank management could reduce the opportunities for genetic change. An animal that is part of a captive-breeding program can produce more young over many more breeding seasons than its wild counterpart, and more of these young can survive to breed themselves. Thus captive parents may have the opportunity of passing on more of their genes in more combinations. This potentially rapid expansion of a captive population could help to mitigate the effects of inbreeding in comparison with wild populations of comparable size. Most importantly, with the slowing of the rate of turnover of the generations in captivity, the opportunity for selective processes to exert pressure upon the genotype is reduced, compared with short-lived natural populations of the same size.



An Andean condor chick hatches in the World of Birds nursery.

Some experts believe that captive populations of fifty animals could preserve half of their genetic diversity over 100 generations under ideal genetic management; 150 might be needed for real security. There are about 30,000 mammals in United States zoos, a number that offers a measure of present capacity. Supposing that half of this capacity could be given over to gene-bank purposes, perhaps only 100 species of mammals could be maintained at 150 specimens per species. The changes implied in zoo management include not only further reductions in the number of species exhibited but also costly revisions of physical facilities, and these may prove less attractive to the visitors who support zoos.

It is clear that gene-bank strategies will require national and international coordination if gene banks are to become a reality. The chances of a single collection maintaining a species for long periods is remote. Gene-bank efforts will be specialized and inter-related. While extant zoos will have an important role to play, they are land-poor; coordination with rural breeding farms and ranches also will be needed. And, if captive gene banks are not subjected to management by rigorous long-term reproductive strategies based upon suitable genetic, demographic, and behavioral-ecological models, all advantage of zoo longevity is likely to be lost.

St. Catherine's Wildlife Survival Center and Bronx Zoo departmental reports chronicle the overall success of the Society's 1978 propagating program, but one example is of special interest. An Andean condor was stimulated to lay three one-egg clutches—a sextupling of the normal "one-egg-every-two-years" pattern of this species. The three chicks produced by this one pair were probably a greater number than those produced by the entire remaining wild population of the California condor, and this demonstrates a reason for increased interest in captive gene banks for faltering species.

In view of the scope of change now being imposed upon the earth's ecosystems and the impossibility of natural evolutionary response within its time frame, man has a responsibility to do more than stand back and wring his hands. He can act to preserve biological diversity even to the extent of transplanting species—of constructing new ecologies—or of preserving diversity by captive propagation.

Almost all zoos are municipally supported, whether by private or public funds. There is, as yet, no national commitment to the preservation of exotic species in gene banks as there is for works of art through the National Endowment for the Arts. And, there are few precedents for exercises in international altruism by municipally oriented institutions. It is time for a re-examination of funding priorities, and it is encouraging that the State of Ohio is now planning a breeding farm for endangered species in a coordinated program with that State's four major zoological parks.

1978 Animal Propagation

Propagation of the collections continued to be the greatest source of Zoo animals. During 1978, 253 mammals, 319 birds and 288 reptiles were born or hatched at the Zoo. Today, for example, 72 percent of the entire mammal collection is captive-bred. In 1928, fifty years ago, only thirty-five mammals were bred at the Zoo—and an even

lesser number of birds and reptiles. While major propagation programs are not yet justified (or feasible) for many marine fishes, new research at the Aquarium seems likely gradually to revise this picture. "Bring 'em back alive" has given way to "breed 'em back alive."

Zoo Visitor Survey

The 1978 Zoo visitor was the subject of a series of surveys developed by Membership Chairman Marie Sexton, who was greatly aided by Roger Seasonwein of Seasonwein Associates. In May, June, and July, for example, Mrs. Sexton's aides interviewed 938 visitors (following a formula wherein every "nth" person was queried) in an effort to learn more about Zoo-goers and where they were from. Although the work continues, even the first three-month report is interesting.

Subway riders now compose only 14 percent of our attendance, contrasting with results of studies from earlier years which suggested that the subway was a principal means of reaching the Zoo. The finding is consistent with the fall-off in subway ridership throughout the City. Arrival by car characterized 68 percent of Zoo visitors. The origin of Zoo-goers during the three-month study was 51.3 percent from New York City; 21.5 percent from New York State outside the City; 24 percent from other states; and 3 percent from foreign countries. Bronx residents composed 24.5 percent of total attendance and New Jersey residents 11.5 percent.

From a bridge over the African Plains, Zoo visitors observe a herd of nyala.



Staff Changes

Associate Curator of Exhibition and Graphic Arts John M. Sutton retired after ten years of service with the Society. Mr. Sutton's many contributions, especially to the exhibits at the World of Darkness, the World of Birds and Wild Asia, will be long remembered. Robert Kosturak replaced Mr. Sutton as Curator. Gregory Long, who has performed with rare effectiveness as a consultant in development, was appointed to the staff as Deputy Director for Development and Membership. Bernard Peyton, currently in the midst of a difficult study of the Peruvian spectacled bear, joined the staff of the Department of Conservation as Conservation Fellow.

William Conway

General Director

New York Zoological Park

Department of Mammalogy

Nineteen seventy-eight marked the first full season of operation for Wild Asia, the largest single exhibit ever constructed in an urban zoo. Visitors to the thirty-eight-acre area enjoyed vistas teeming with Asian wildlife in a series of habitat displays ranging from the rugged heights of the "Karakoram Range" in Kashmir to the swampy lowlands of central India. During the year, all but two of the ten mammal species exhibited here produced young; both the elephants and rhinoceros are still immature. Most notable among the births were two gaur calves, five Eld's deer, four barasingha deer, fourteen Formosan sika deer, four Himalayan tahr, and five Siberian tigers.

At year's end, the mammal collection numbered 144 forms and 1,086+ specimens. In all, 59 species of mammals produced 322 offspring. Especially significant were five Grevy zebras, one proboscis monkey, two snow leopards, two giraffes, and a polar bear.

During 1978, Toto, a female African elephant on loan to the Knoxville Zoo in Tennessee, gave birth to a male calf that weighed in at 200 pounds. This is the first time this species has reproduced in the Western Hemisphere.

Because reproductive success continues to increase, a flexible, long-term propagation plan was initiated this year outlining collection needs, exhibit capacities, and herd sizes as standards for management.



A gaur and calf, the first to be born at Wild Asia.

Curatorial research centered on programs designed to raise activity levels in many displays by eliciting natural behaviors from the animals, on schedule, and by demonstrating them to the public. An animal behaviorist, supported by the National Endowment on the Arts, and the National Museum Act, joined the department during the year for this purpose and initiated training programs with sea lions, wolves, otters, and lion cubs. One successful effort to stimulate animal activity was a large tree trunk constructed of reinforced concrete for the Kodiak brown bear display. This realistic-looking tree is programmed to release honey from a fissure in its side at given intervals; a buzzer sounds at the same time alerting the bears to the treat.

Expansion of existing exhibits and construction for new ones continued in 1978. Wolf Wood is being enlarged almost three-fold, and ground was broken for a rare African mammal building. Made possible by a gift from Mr. and Mrs. James Walter Carter, the building will house giraffes, zebras, and, it is hoped, okapis. Construction on the new Wild Asia Jungle Building continued. The largest building ever constructed at the Zoological Park, it will be the home for families of proboscis monkeys, spectacled langurs, gibbons, tapirs, gavials, and Komodo monitors. A new "watering hole" added to the African Veldt exhibit serves as a naturalistic barrier between zebras and gazelles and also provides a new habitat for waterfowl.

Mammal Collection, Bronx Zoo
at December 31, 1978

Order:	Families	Species	Specimens
Marsupialia —Kangaroos, phalangers, opossums	2	6	38
Chiroptera —Bats	3	12	161 +
Primates —Apes, monkeys, lemurs, marmosets, etc.	6	27	130
Edentata —Armadillos, sloths, anteaters	2	2	3
Rodentia —Squirrels, mice, porcupines, etc.	11	25	113 +
Carnivora —Bears, raccoons, cats, dogs, otters, etc.	6	29	96
Pinnipedia —Seals, sea lions, etc.	2	2	4
Proboscidea —Elephants	2	2	8
Perissodactyla —Horses, tapirs, rhinoceroses	3	6	37
Artiodactyla —Cattle, sheep, antelopes, camels, giraffes, deer, swine, hippopotamuses	8	33	496
Totals	45	144	1,086 +

(Only specimens owned by the New York Zoological Society are included.)

Department of Ornithology

Years of planning and acquiring specimens to effect a sound program for breeding cranes and South American condors finally paid off for the department in 1978 with the hatching and rearing of thirteen cranes of three species and three condors from a single adult pair. Government restrictions continued to impose serious problems in the acquisition of new birds for the collection, but a number of important specimens were acquired from other zoos and propagators by loan or trade. Most notable of these were a female Malayan wreath-billed hornbill to replace a female lost early in the year, a male wattled crane, a male paradise crane, and a female Bornean argus pheasant. Purchased from a dealer with a federally approved station for quarantining overseas shipments were four green aracari toucans, six turquoise callistes, and five black-cheeked callistes—the largest consignment of South American birds to be received here since 1972.



At the end of 1978, the Society's bird collection numbered 1,497 + specimens of 306 species and subspecies. Over 78 percent of all the birds accessioned during the year were hatched in the Zoo. Among the highlights of the breeding season was the hatching and rearing of three hooded cranes, seven white-naped cranes, and three demoiselle cranes. Although the white-naped cranes have been regular breeders in the collection, it was the first time the dainty demoiselles were hatched here, and only the second time that the rare hooded crane has been reared in captivity. The hatching and rearing of two Indian pigmy geese by a pair on display at the World of Birds appears to be a first breeding for this species in a zoo or collection anywhere.

Continued success in breeding tufted puffins, Inca terns, sunbitterns, Palawan and Malayan peacock pheasants, green wood hoopoes, tawny frogmouths, and Malayan banded pittas prompted the development of a long-term breeding plan with special emphasis on cooperative propagation projects with the National Zoo in Washington, D.C., and the Philadelphia Zoological Park.

Above, the World of Birds is both an exhibition and a breeding facility. The concave-casqued hornbills in this exhibit are a breeding pair. Right, Every November, Zoo keepers take to the water for the annual pelican round-up. With visitors, reporters, and photographers in attendance, the birds are gathered for the move to their winter quarters.

Several physical improvements for the year were also tied to the breeding effort. The most important of these was a series of small shelters to house young cranes constructed in the off-exhibit propagation area behind the World of Birds. At the Eagles and Vultures Aviaries, three fiber glass nesting cliffs were built for condors and hooded vultures.

Curatorial research continued to center on perfecting methods for artificial insemination, incubation, and hand-rearing techniques. A curatorial trainee joined the department during the year to study zoo management and to aid with research projects.

Bird Collection, Bronx Zoo at December 31, 1978

Order:	Families	Species	Specimens
Struthioniformes —Ostriches	1	1	4
Rheiformes —Rheas	1	1	11
Casuariformes —Cassowaries, emu	2	2	7
Tinamiformes —Tinamous	1	2	12
Sphenisciformes —Penguins	1	4	8
Pelecaniformes —Pelicans, cormorants, etc.	2	4	18
Ciconiiformes —Hérons, ibises, storks, flamingos, etc.	4	18	99
Anseriformes —Swans, ducks, geese, screamers	2	75	425 +
Falconiformes —Vultures, hawks, eagles	3	9	23
Galliformes —Quail, pheasants, etc.	3	20	170
Gruiformes —Hemipodes, cranes, trumpeters, etc.	5	21	113
Charadriiformes —Plovers, sand- pipers, gulls, etc.	9	28	188 +
Columbiformes —Pigeons, doves, sand-grouse	1	4	8
Psittaciformes —Parrots, etc.	1	12	34
Cuculiformes —Touracos, cuckoos	2	8	26
Strigiformes —Owls	2	11	23
Caprimulgiformes — Frogmouths, nighthawks	1	1	29
Apodiformes —Swifts, hummingbirds	1	1	1
Trogoniformes —Trogons, quetzels	1	1	1
Coraciiformes —Kingfishers, hornbills, etc.	5	9	42
Piciformes —Barbets, toucans, woodpeckers	3	4	15
Passeriformes —Perching birds	24	70	240
Totals	75	306	1,497 +

Department of Herpetology

With a total of 288 reptiles and amphibians born or hatched at the Reptile House, 1978 was an unparalleled year for propagation in the Department of Herpetology. A gain of 138 births over the previous year, this figure also represented 70 percent of the year's acquisitions. The development of a long-range breeding program plan that satisfies the exhibition, research, and conservation needs of the department, as well as providing specimens for cooperative breeding programs with other institutions, has produced desired results. About 200 specimens, largely progeny of the collection, were sent to more than forty such institutions around the globe, including many American, European, and Australian zoological parks.

Most notable among the other additions to the collection was a series of Lake Titicaca frogs, presented by Trustee Nixon Griffis. Collected in the high Andes of Bolivia, on an expedition led by Mr. Griffis, these unusual bottom-dwelling amphibians had never been observed to surface for air. Loose folds of skin on their bodies bear numerous beds of tiny blood vessels which serve as breathing "gills." The Titicaca frog exhibit here marks another "first time anywhere" for the Bronx Zoo.

Also acquired during the year were two Lake Tanganyika water cobras, a pair of ridge-nosed rattlesnakes, three amethystine pythons, six young endangered Jamaican boas, four red-head Amazon sideneck turtles, a pair of Sinaloan milksnakes, three Suriname ameiva, and a series of Sonoran spotted whiptail lizards.

Symbolic of long-term departmental propagation programs was the hatching of Muhlenberg's turtles for the sixth consecutive year. Nineteen seventy-eight was also a very productive year for boids and cobras. Rarely bred in captivity, three female common anacondas and a yellow anaconda gave birth collectively to ninety-one youngsters. Among the cobras, young were reared from king, red-spitting, black-lipped and Asiatic species.

In addition to renovating and refurbishing many of the indoor displays and holding areas in the Reptile House, departmental staff created a new outdoor display on a pond adjacent to the building. Named the New York Swamp Exhibit, it features local reptiles and amphibians along with wood ducks and a collection of native swamp plants.

Among the 1978 hatchlings at the Reptile House nursery are, left, a reticulated python, and right, a red spitting cobra. Opposite page, a chilly, aquatic environment was specially created in the Reptile House to exhibit the Lake Titicaca frog.





**Reptile and Amphibian Collection, Bronx Zoo
at December 31, 1978**

Class: Amphibia	Order:	Families	Species	Specimens
	Caudata —Salamanders	2	5	7
	Salientia —Frogs, toads	5	12	44
	Totals	7	17	51
Class: Reptilia	Order:	Families	Species	Specimens
	Chelonia —Turtles	7	35	158
	Crocodylia —Alligators, caimans, crocodiles	2	14	61
	Squamata			
	Suborder:			
	Sauria —Lizards	11	23	56
	Serpentes —Snakes	4	59	293
	Totals	24	131	568

(Only specimens owned by the New York Zoological Society are included.)

Department of Animal Health



The mother of this leopard cat has not been successful in raising her kittens. When this female was born in the Fall of 1978, it was immediately placed in the warmth of an incubator and hand-reared by Society staff. As the kitten matured, it needed to spend less and less time in this controlled environment.

Several serious health problems that developed in the Departments of Mammalogy and Ornithology during 1978 were of particular concern to the veterinary staff. The first of these began on New Year's Day, when many animals in the Formosan deer herd at Wild Asia became ill. Diagnosed as salmonellosis, the disease was believed to be carried by starlings that roosted in the animal shelters. Prompt isolation of this herd from other groups of animals in the area prevented the disease from spreading, and vigorous treatment with intravenous fluids helped reduce mortality. Netting was installed in all the shelters to prevent birds from roosting on the beams.

Cold, wet weather also contributed to an outbreak of necrobacillosis in the Thomson gazelle herd in the African Veldt display. The low resistance of the animals, due to bad weather, necessitated their removal to indoor housing for the remainder of the winter. In spring, extensive renovations to the exhibit included replacement of topsoil and improved drainage to ensure against recurrence of the disease.

At the World of Birds, an outbreak of aspergillosis developed as a result of poor ventilation and excessive moisture from melting snow that entered the air-duct system of the building. A serological test developed by Dr. Raymond Napolitano, whose work was supported by the Madison and DeForest Grant Research Fund, was effective in diagnosing the disease in infected birds, which could then be isolated and treated. Air-filter changes and removal of ground surface materials were important in preventing further infection.

In the Department of Herpetology, over 500 examinations and treatments were effective in significantly reducing mortality for the second straight year.

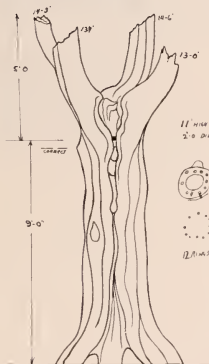
Research studies continued on avian aspergillosis, and investigations in the area of enzyme-linked immunosorbant assays were initiated. This technique will allow for greater reliability by assaying for circulating antigen. Additional stocks of antigen and antisera are now being prepared for distribution to other zoos for further clinical trials of the currently available serum test.

Amoebic research moved forward with the development of new techniques for the serum-free cultivation of *Entamoeba invadens*. An additional technique has also been perfected employing the growth of these organisms in agar plates, allowing the direct determination of *in vivo* serum levels of anti-amoebic agents.

Among hospital-staff activities, Dr. Elizabeth Russo, resident in comparative medicine, concentrated her efforts in reptilian disorders and participated in a cooperative program with The Animal Medical Center. Dr. Alan Herron began a three-year residency under the Astor-Thomas pathology training program. This joint program with The Animal Medical Center is now in its seventh year and has already been responsible for training two comparative pathologists.

Department of Exhibits/ Graphics

To stimulate greater activity in the adult Kodiak bears, Zoo curators and exhibition designers created this mechanical feeding device—a honey tree. Left, the exhibition department produced a schematic drawing which was used, center, to construct the concrete tree. Right, the experiment was a success.



With the outdoor areas of the Wild Asia complex completed and construction underway on the Wild Asia orientation building, 1978 had just enough time for the Department of Exhibits/Graphics to take a deep breath and dig into a groaning backlog of work orders demanding attention and service from each of its disciplines.

In the graphics division of the department, which includes the print shop, a series of brochures and posters was produced for the Aquarium, membership department, Children's Zoo, Animal Kingdom Tours, and the Friends of the Zoo. Graphic presentations were executed for the chambered nautilus exhibit at the Aquarium and for the temporary wall around the Wild Asia building construction site. A logo was designed for the Society's Wildlife Survival Center on St. Catherine's Island. It will be used as an insignia for staff uniforms and as a sticker identifying vehicles.

In addition to completing a variety of repair jobs—including such items as renovating the ornate woodwork rafters on the 1904 Small Mammal House / Ostrich House arcade and repairing the fiber glass bodies of fifteen tractor-train cars—the exhibits shop designed and executed several new display features. Prominent among these was a honey tree for the Kodiak bear enclosure. Made of reinforced concrete, the fifteen-foot-tall replica of a weathered tree trunk provides a treat for the bears by dispensing honey from a crevice in its side at regular intervals. To reach the nine-foot-high cavity, the bear must stretch to full height, providing the visitor with a special treat.

At the Eagles and Vultures Aviaries, three new nesting cliffs were added to the larger displays for breeding condors and hooded vultures. Made of cement reinforced with fiber, the cliffs offer opportunities for both ledge and cavity nesters.



Wildlife Survival Center



The East African addax, above, and Australian red kangaroo, below, are among the residents of St. Catherine's Island.

Programs for the propagation of endangered wild animals continued to expand on St. Catherine's Island during 1978 with the addition of two important mammal herds and six rare species of birds. Two male and four female Grevy zebras—a species whose numbers have been greatly reduced in East Africa due to poaching—were acquired from several sources and arrived at the Survival Center during the spring and summer. They are now established on a ten-acre range. Rarer still, a male and six female Jackson hartebeest were sent down from the Bronx Zoo collection in late fall for a concentrated breeding effort on the Island. A six-acre enclosure is under preparation for them. Among the birds received were seventeen cranes of four species, including the striking wattled cranes of eastern and southern Africa, and a pair of rare Pesquet's parrots from New Guinea.

With the coming of age of many of the mammal groups, reproduction increased sharply. Most notable among the twenty-five mammals born at the Center were four dama gazelles, four addax, and two sable antelope. The successful hatching and rearing of a Leadbeater's cockatoo chick by a pair in residence less than a year marked the beginning of the parrot breeding program.

Development and expansion of animal facilities continued with the fencing of a five-acre marshy enclosure for sitatungas, a three-acre pasture for red kangaroos, and nine new crane yards. As an aid to better management, a thirty-three-foot-high observation tower was erected in a central location from which most of the animal collection can be monitored.

Wildlife Survival Center Collection at December 31, 1978

Class:	Order:	Families	Species	Specimens
Aves	Anseriformes —Geese	1	1	14
	Gruiformes —Cranes	1	6	23
	Psittaciformes —Parrots	3	4	15
	Totals	5	11	52
Class:	Order:	Families	Species	Specimens
Mammalia	Marsupialia —Kangaroos	1	1	7
	Artiodactyla —Antelopes	2	7	60
	Perissodactyla —Horses, tapirs, rhinoceroses	1	1	6
	Totals	4	9	73

(Only specimens owned by the New York Zoological Society are included.)

New York Aquarium

From the beautiful coral reefs of Palau Island in Micronesia, to the muddy streams of Suriname—and a few far-flung places in between—came the new collection of exotic fish and invertebrates that helped make 1978 a very exciting exhibit year at the New York Aquarium. An increase in attendance of more than 10 percent seems to bear this out. Another boost to attendance came in a friendly gesture from the Brooklyn Union Gas Company, which set aside the entire lobby of its Montague Street showroom for exhibits highlighting the Aquarium.

Trustee Nixon Griffis led the expedition to Palau, where coral-reef fish and deep-water chambered nautiluses were the special prizes. Collected in Chile was the fascinating clingfish, an odd flat-bodied tadpolelike fish, whose ventral fins are joined to form a sucking disc with which it clings to submerged rocks, holding a constant position even in the strongest currents. Coming from Philippine waters were the spectacular lantern fish, creatures of the dark that live at great depths and come to the surface only on moonless nights. An array of light-producing bacteria under each eye of these strange fish forms a subocular beam, which they use for finding food and each other. Trumpet catfish, electric rays, and giant toadfish were among the specimens of freshwater fishes from Suriname.



Among the species collected for the New York Aquarium by Society Trustee Nixon Griffis were the chambered nautilus, right, now on display at the Aquarium, and the giant toadfish, above, the largest member of the Batrachoidiformes order.



Not all of the additions to the collection came from expeditions to distant areas of the world. Four black-footed penguins were hatched to join the ever-increasing spheniscid colony, and a female gray seal, born on Washington's birthday, was duly named "Martha."

The long-awaited ground-breaking for the new shark tank took place and the exhibit should be completed in 1979. The novel design of the new display will give the visitor a three-sided view of these fearful, but ever-popular denizens of the deep. Funding for the new display had come from the Cordelia Scaife May Charitable Trust, The Vincent Astor Foundation, the G. Unger Vetlesen Foundation, and the Natural Heritage Trust, at December 31, 1978.

Birthdays are always fun. At the Aquarium, a very special birthday was celebrated in 1978, when Blanchon, the majestic white whale, was twenty-one years old. Born the same year that the Aquarium opened in Coney Island, he joined the collection at the tender age of four and has proven himself a visitor-favorite.

Aquarium Collection at December 31, 1978

Phylum: **Chordata**

Class:	Order:	Species and Subspecies	Specimens
Chondrichthyes —Sharks, rays and chimeras	Heterodontiformes —Horn shark	1	2
	Squaliformes —Dogfish sharks	5	13
	Rajiformes —Rays	1	3

Class:	Order:	Species and Subspecies	Specimens
Osteichthyes —Bony fishes	Elopiformes —Tarpon, bonefish	1	3
	Anguilliformes —Eels, morays	3	6
	Salmoniformes —Trouts	1	2
	Cypriniformes —Minnows, carp, cavefishes	5	66
	Siluriformes —Freshwater catfishes	7	28
	Cyprinodontiformes —Platy, swordtails	4	31
	Batrachoidiformes —Toadfishes	2	41
	Gadiformes —Codfishes	1	2
	Atheriniformes —Killifish, silversides	4	250 +
	Beryciformes —Squirrelfishes	5	11
	Gasterosteiformes —Seahorses, pipefish	1	14
	Perciformes —Perches, sea basses	104	712
	Pleuronectiformes —Flatfishes	3	12
	Tetraodontiformes —Puffers, boxfish, triggerfish	3	3

Superorder:

Ceratodimorpha—Lungfishes

		Family:	
		Ceratodidae —Australian lungfish	1
		Protopteridae —African lungfish	1
Class:	Order:	Species and Subspecies	Specimens
Reptilia	Chelonia —Turtles	8	17
Class:	Order:	Species and Subspecies	Specimens
Aves	Sphenisciformes —Penguins	2	22
	Anseriformes —Ducks	3	11
Class:	Order:	Species and Subspecies	Specimens
Mammalia	Pinnipedia —Seals, sea lions	4	15
	Cetacea —Whales, dolphins	2	7
		Phylum:	
		Coelenterata	
Class:			
Anthozoa —Corals and Anemones		15	10,000 +
		Phylum:	
		Annelida	
Class:			
Polychaeta —Marine worms		3	16
		Phylum:	
		Arthropoda	
Class:			
Crustacea —Lobsters, shrimps, crabs, etc.		12	270
Class:			
Arachnida —Horseshoe crab		1	20
		Phylum:	
		Mollusca	
Class:			
Amphineura —Chitons		1	2
Class:			
Gastropoda —Snails		7	186
Class:			
Pelecypoda —Bi-Valves		5	550
Class:			
Cephalopoda —Octopus		1	5
		Phylum:	
		Echinodermata	
Class:			
Asteroidea —Starfish		7	110
Class:			
Holothuroidea —Sea cucumbers		2	12
Class:			
Echinoidea —Sea urchins		5	74
Totals:		231	12,518 +

Osborn Laboratories of Marine Sciences

The first vertebrates to appear on earth were fishes, and one of the most important areas of research in vertebrate biology is the interplay of genes on hormones and their effect on body growth and sexual maturation. It is one thing to know that a specific gene is responsible for the onset of sexual maturity. It is something else to pinpoint the original target of gene action. Preliminary experiments in the genetics laboratory indicated that the pituitary might be the site of direct gene influence; microscopic analysis of the pituitary gland showed early and late cellular differentiation were consistent with early and late sexual maturation. But things are not always as simple as they seem.

By setting up an intricate set of pituitary-transplant experiments, Dr. Klaus D. Kallman was able to show that it was not the information contained in the donated pituitary that was telling, but rather the information already encoded in the recipient. If a pituitary from an early-maturing fish is transplanted into a late-maturing fish, that fish will still mature late. The site of gene action is antecedent to any action on the pituitary.

Dr. Kallman suspects that the initial genetic influence is on the hypothalamus, an area of the brain located above the pituitary that appears to be a very active relay station. The hypothalamus then exerts its effect upon the pituitary which in turn releases a hormone that leads to sexual maturation. A series of experiments involving the transplantation of the hypothalamus is presently being undertaken to determine whether the hypothalamus is indeed the primary site of genetic influence in effecting sexual maturity.

Another aspect of the sexual maturation/growth axis concerns certain female fishes that are unable or have lost the ability to reproduce, and whose ovaries have regressed. These females become more full-bodied and heavier than their progeny-bearing counterparts. It appears that the energy that would normally be directed toward reproduction is directed toward increased size. These studies dealing with the interplay of genes to hormones and the effects on growth, sexual maturity, longevity, etc., are extremely important in the field of aquaculture.

Fish are susceptible to a variety of diseases. Dr. Paul J. Cheung has been particularly interested in the life cycles of certain one-celled parasites and their specific effects on the health of aquarium fish. By using the scanning electron microscope, it has been possible to show that some of these parasites inflict their damage directly—by blanketing areas of the gill and interfering with breathing—and indirectly—by irritating gill structures until the gill filaments are actually fused, reducing the effective area for oxygen transfer.

Parasite studies are also underway on the winter flounder in its offshore habitat, from New York to Nova Scotia. The species



Scanning electron micrograph of the early developmental stage of the squid *Loligo pealei*, removed from the egg approximately eight days after fertilization.

was chosen because it is a delicious food source, a potential subject for mariculture, and an important sport fish. It appears that the number and variety of parasites on winter flounders will, over a period of time, provide information on the degree of pollution of its environment.

Another disease-producing organism often associated with pollution is a bacterium known as *Vibrio*, one species of which is found in fish such as salmon and eels, and another in shellfish. The latter is responsible for intestinal disorders in humans who eat infected shellfish. A study on this bacterium will try to determine the effects of certain heavy metals, like zinc and nickel, on the metabolism of this organism.

Autopsies on some of the chambered nautilus that failed to survive the trip to the Aquarium from Palau Island revealed crystalline bodies in the kidneys. Using the scanning electron microscope, Dr. Kenneth Gold was able to characterize the shapes of the mineral concretions and to identify chemically the crystalline formations. The material was apatite, a solid substance rich in calcium and phosphorus, which may be analagous to kidney stones in humans and perhaps stress-induced. A series of experiments was designed to determine whether other molluscs might be stressed to produce this effect, and to specify the factors involved and the actual process of crystal formation. Dr. Gold also has continued his studies on tintinnids (ciliated protozoa). These one-celled organisms take minerals from the environment and use them in building their outer shells.

Some of the difficulties encountered in trying to rear squid from hatching to adult are related to the availability of proper food. A study outlining the steps and factors involved in raising invertebrate species such as the squid, an opossum shrimp, and a tube-dwelling amphipod is now in process. The small shrimp is being reared as a potential food for the hatchling squid.

Post-doctoral students working at the Osborn Laboratories this year and supported by grants from the Jessie Smith Noyes Foundation, Inc., were Dr. John Burns (sexual maturation and growth in fish), Dr. Peter Burn (parasites in the winter flounder), and Dr. Betty Borowsky (factors involved in attempting to rear invertebrates).

Visiting scientist Dr. Michele Peuto-Moreau, from the Université de Nice and the Station Zoologique, Ville-franche-sur-Mer, France, spent three months doing electron microscopic studies on tintinnids with Dr. Gold.

International Field Science and Conservation

Recognition of the Society's broad efforts in the field of conservation was confirmed again in 1978 by the presentation of the American Association of Zoological Parks and Aquarium's Conservation Award for the third consecutive year. The Society also received an American Motors Conservation Award, and its conservation program was accorded special recognition through honors bestowed on its staff members. Dr. George Schaller and Dr. Roger Payne were made Knights of the Golden Ark by H.R.H. Prince Bernhard of the Netherlands. General Director William Conway was re-elected to the governing council of the International Union for the Conservation of Nature and Natural Resources (IUCN), Dr. F. Wayne King, Director of Conservation, was appointed Deputy Chairman of the IUCN's Survival Service Commission and elected Chairman of the American Committee for International Conservation.

The Society's international wildlife conservation program is one of the most extensive non-governmental programs of field research and conservation. Each year it receives a large number of grant requests from independent researchers. In 1978, seventy proposals were reviewed for possible support and thirty-four projects were approved for funding, spanning a total of thirty-three nations.

Center for Field Biology and Conservation

Returning to his base camp in the Brazilian Mato Grosso early in spring 1978, Dr. George Schaller continued his field work on the jaguar. After trapping several animals and fitting them with radio transmitters, he began a study of their range size, activity periods, movement patterns, and predation. Unfortunately, the work had to be discontinued when local ranch hands shot two of his study animals.

During the fall Dr. Schaller carried on an intensive study of the capybara, the world's largest rodent, with particular emphasis on social organization, behavior, and population structure. In preparation for a field study of the Paraguayan caiman, he caught and tagged about seventy-five of these animals so that individuals might be recognized while courting, maintaining territories, nesting, or making seasonal movements. Preliminary observations showed that caimans live mainly on fish and, in over 700 hunting attempts, their successful catch rate was about twenty percent.

For the eighth consecutive year, Dr. Thomas Struhsaker continued studies of colobus monkeys, red-tail monkeys, and mangabeys in the Kibale Forest of Uganda. One of the year's most significant findings was that female colobus monkeys may change social groups. Such transfers are known to occur in only a few primates, that is, chimpanzees, gorillas, and some human cultures.

Dr. Roger Payne spent much of the year analyzing whale data collected during 1977 and correlating it with information from previous years. A number of exciting discoveries came to light as a

result. Callosities, the thickened skin areas found on the heads of both the male and female right whale, enable individuals to be identified by the patterns. Using this method, it was possible for field researchers making aerial surveys from Dr. Payne's Argentina "whale station" to recognize many specimens as they returned to the breeding grounds and to record an increase in the population. It was also possible to determine that some known females were calving for the third time. Further analysis of these callosities seems to bear out Dr. Payne's earlier suggestion that these streamlined underwater "antlers" may be used primarily for fighting.

Research continued on the humpback whale and its song. Analysis shows that the song at the beginning of the season is exactly the same as it was at the end of the previous year. Dr. Payne has submitted a proposal to the Federal government to designate the waters around Maui, Hawaii, as a marine sanctuary for humpback whales.

Three graduate students working under the direction of Center scientists earned advanced degrees during 1978.



Society Research Zoologist George Schaller fits a jaguar with a radio tracking device in Brazil's Mato Grosso. The wildlife of this swampy region is the subject of intensive studies by Society-sponsored field scientists.

Department of Conservation

An important component of the New York Zoological Society's international conservation program is its staff of full-time field researchers. During the past year, Primate Ecologist Russell A. Mittermeier, whose position is supported by the World Wildlife Fund, spent three months in Suriname completing a project on primate synecology and studying the effect of predation by local people on monkeys. Acting in his capacity as Chairman of the IUCN Survival Service Commission's Primate Specialist Group, Dr. Mittermeier consulted with Venezuelan conservationists, discussing appropriate IUCN projects to prevent the extinction of Venezuelan primates.

In Peru, Dr. Mittermeier helped a Society-sponsored researcher initiate a field study of the endangered red uakari. Before returning to the U.S., he visited Brazil, laying the groundwork for a study of endangered eastern Brazilian primates.

Resource Ecologist David Western continued as acting head of, and advisor to, the Kenya Wildlife Planning Unit (WPU). The WPU is charged with drawing up long-term plans for the development and management of wildlife resources throughout Kenya. During 1978, Dr. Western made a three-week tour of U.S. national parks surveying habitat, wildlife, and methods of tourist management.

NYZS Conservation Fellow Bernard Peyton conducted a survey of the spectacled bear in Peru and found that the species is highly adaptable to a variety of habitats, from lowland deserts to alpine tundra. Although extremely rare along the coast of Peru, the bear does not appear to be endangered throughout its range. Mr. Peyton also discovered the first nest ever recorded for the endangered white-winged guan and surveyed part of the bird's habitat. With Peruvian associates, he was instrumental in initiating new laws curtailing lumbering in certain of these areas.

During 1978, General Director William Conway served as a member of the governing council and the executive bureau of IUCN. He was elected to another term on the board of the American Section of the International Council for Bird Preservation (ICBP) and chaired the section's reorganization committee. Elected to the board of the American Association of Zoological Parks and Aquariums, he served as chairman of its Animal Surplus Committee.

As a member of the Survival Service Commission's Parrot Specialist Group, Mr. Conway hosted a meeting in New York in March. A trustee of the American Appeal of the World Wildlife Fund and a member of its program committee, he attended meetings and provided counsel on a variety of issues. He continued as a member of the board of the Cornell University Laboratory of Ornithology and of the Asa Wright Nature Center in Trinidad. Throughout the year, the Society's General Director maintained close ties with NYZS conservation interests in Argentina, providing counsel to the Argentine national parks system. At the request of the American Ornithologists' Union and the National Audubon Society, he served as a member of a nine-man committee formed to evaluate the status of the California condor and to formulate a program for its future.

Dr. Donald Bruning taught graduate courses in wildlife conservation and vertebrate natural history at Fordham University and continued to serve as secretary of the Parrot Working Group.

In February, Director of Conservation Dr. F. Wayne King chaired the IUCN/SSC Crocodile Specialist Group's Fourth Working Meeting in Madras, India. Later that same month, he attended the IUCN Marine Steering Committee meeting in Guadeloupe.

In Tampa, Florida, Dr. King participated in a Fish and Wildlife Service/National Marine Fisheries Service meeting to critique their program for sea-turtle conservation in the southeast. At the IUCN Fourteenth General Assembly in Ashkhabad, USSR, Dr. King was elected deputy chairman of the SSC.

Major contributors to this year's International Wildlife Conservation Program were the Clark Foundation, Nichols Foundation, Inc., the Helen S. Mayer Charitable Trust, the Paul Guenther Fund, and the Muskiwinni Foundation. In addition, the development of a campaign to promote the Society's conservation program was made possible through a previous grant from Mrs. Allerton Cushman.

Field Projects Around the World



Project		Investigator	1978 Grant
1 Colorado	Completion of a manuscript on the status of primates	Jaclyn H. Wolfheim	\$3,350.
2 Wisconsin Siberia	Partial support for continuation of Siberian crane recovery plan which is part of the US/USSR cooperative environmental protection program	International Crane Foundation	\$6,000.
3 U.S. Northeast	Nesting site specificity of peregrine falcons	Clayton White	\$ 200.
4 Canada	A study of environmental factors affecting high Arctic sea ice habitat of polar bears	Sandra Martin	\$3,000.
5 Canada Greenland	Short term study of the status, biology and outward relationships of northern Baffin Bay-Kane Basin polar bears	Harrie Sherwood	\$5,100.
6 Mexico	Partial support for field studies of 13 pupfish species to implement a preservation program	Michael Smith Julian Humphries	\$5,000.
7 Mexico	Partial support for documentation of the nesting sites of maroon-fronted parrots	W. Grainger Hunt Dirk V. Lanning Peter W. Lawson	\$4,712.
8 Venezuela Suriname Peru Brazil	Primate conservation	Russell A. Mittermeier	Staff
9 Guyana	Partial funding of population distribution survey and behavioral study of the giant otter	Elizabeth Laidler Keith Laidler	\$ 500.

10 Peru	Survey of the status of the red uakari	Roy Fontaine	\$1,400.
11 Peru	Primate conservation education display in the Natural Museum of San Marcos University, accompanied by a display of the only two living yellow-tailed woolly monkeys in captivity	Hernando de Macedo-Ruiz	\$2,000.
12 Peru	Preliminary survey of marine turtles	Coppelia Hays	\$2,800.
13 Peru	Survey of spectacled bear	Bernard Peyton	Conservation Fellow
14 Brazil	Conservation studies of jaguar, marsh deer, capybara, and caiman	George Schaller	Staff
15 Brazil	Field investigation of ecology and behavior of the brown capuchin monkey	Cecilia T. de Assumpcao	\$1,000.
16 Argentina	Partial support of <i>Caiman latirostris</i> and <i>C. crocodilus</i> , and analysis of economic significance of the crocodilians	Marc Nadeau	\$8,000.
17 Cape Verde Taiwan	Whale conservation	Roger Payne	Staff
18 Cameroon	Project to facilitate establishment of four national forests, to include 21 different primates, and species survey for suitable site to establish lowland gorilla sanctuary	J. Stephen Gartlan	\$4,615.
19 Rwanda	Additional funding for continuation of study of the feeding ecology and habitat needs of the mountain gorilla	Amy Vedder William Weber	\$1,518.
20 Uganda	Continuation of study of five primate species in Kibale Forest	Thomas Struhsaker	Staff
21 Kenya	Partial support for study of the effects of human activities on cheetahs	David Burney	\$7,500.
22 Kenya	Continuation of elephant survey and conservation program	Iain Douglas-Hamilton	\$20,000.
23 Kenya	Head of and Advisor to the Wildlife Planning Unit in Kenya's Ministry of Tourism and Wildlife	David Western	Staff
24 Tanzania Kenya	Partial support for ecological study of high-pastoralist and wildlife interaction, and agricultural encroachment in Maasailand	Tepilit Ole Saitoti	\$5,000.
25 Tanzania	Partial support for a zebra and wildebeest census to continue monitoring the dominant species of the Serengeti ecosystem	A.R.E. Sinclair	\$2,500.
26 Zambia	Stage I of survey of wattled crane, results of which will be presented to Zambian government with suggestions for conservation, conceivably including wetland national parks	George Archibald	\$3,986.40
27 Zambia	Additional funding for Stage I of conservation project of the wattled crane	George Archibald Paul Konrad	\$7,182.
28 India	Ecological survey of Ashambu Hills, Western Ghats, with emphasis on conservation of lion-tailed macaque and Nilgiri langur—reconnaissance trip	John F. Oates	\$1,120.
29 India	Project to census two areas of Nilgiri tahr, an endangered species restricted to hills of South India, and study predation on the species	Clifford G. Rice	\$1,288.10
30 Bangladesh	Survey of distribution of Asian elephant populations to determine the impact of human populations	Mohammed A. Reza Kahn	\$1,000.

31 Thailand	Partial support for development of research and training program at Huay Kha Khaeng Game Sanctuary	Ardith Eudey	\$5,000.
32 Thailand	Study of ecology and behavior of pileated gibbon in Khao Soi Dao Wildlife Sanctuary	Sampod Srikosarmatara	\$1,690.
33 Thailand	Funds for Dr. Brockelman and S. Srikosarmatara to present papers on their pileated gibbon research at the Seventh Congress of the International Primatological Society	Warren Y. Brockelman	\$ 680.
34 Malaysia	Supplementary grant for study of endangered sea turtles and river turtles nesting on the coast of Trengganu	Edward O. Moll	\$2,000.
35 Indonesia	Continuation of long-term study of orangutan adaptation at Tanjung Puting Reserve	Birute Galdikas-Brindamour	\$3,750.
36 Philippines	Conservation and managment of Gray's monitor lizard, with specimens to be obtained for an experimental captive breeding program	Walter Auffenberg	\$2,550.

1978 Publications of the Scientific Staff

Behler, John L. Feasibility of the establishment of a captive breeding population of the American crocodile. U.S. National Parks Service Technical Report Series.

Bell, Joseph. Brother, can you spare a park? *Animal Kingdom*, 81(6):12-19.

Borowsky, Betty. The relationship between tube-sharing and the time of the female's molt in *Microdeutopus gryllotalpa* and *Ampithoe valida* (Crustacea: Amphipoda). *American Zoologist*, 18(3):621.

Bruning, Donald F. The McKinley image: a zoologist's journal. *Animal Kingdom*, 81(5):37-48.

—Nandus pflegen Partnertauch Ein anderer Weg der Art-Erhaltung. *TIER*, January.

—Ratites (with Emil P. Dolensek), pages 167-180. *In* Zoo and Wild Animal Medicine. W. B. Saunders Company, New York.

—Techniques for rearing insectivorous birds. The First International Birds in Captivity Symposium. March 8-12.

—The need for long-term propagation efforts by zoos and aviculturists. The First International Birds in Captivity Symposium. March 8-12.

—Records and bird propagation. AAZPA 54th Annual Conference, Denver, Colorado. September.

—The need for long-term propagation efforts by zoos and aviculturists. American Pheasant and Waterfowl Society and International Wild Waterfowl Association Meeting. October.

Cheung, Paul J. Effects of temperature and salinity on the developmental cycle of *Oodinium ocellatum* Brown. Abstract, IV International Congress of Parasitology at Poland.

—Scanning electron microscopic observations on the various stages of the life cycle of *Oodinium ocellatum* Brown (with George D. Ruggieri and Ross F. Nigrelli). Abstract, American Microscopical Society Meeting.

Conway, William. A different kind of captivity. *Animal Kingdom*, 81(2):4-9.

—Memo from a laboratory primate. *Animal Kingdom*, 81(4):17-25.

—A different kind of captivity. *Vital Speeches of the Day*, 44(9):264-267.

—A different kind of captivity. *The Zoogoeer*, 7(4):3-12.

—Report of the advisory committee on the California condor (with R. E. Ricklefs [ed.] and D. Amador, R. S. Miller, I. C. T. Nesbet, R. W. Schreiber, U. S. Seal, R. K. Selander, and S. A. Temple). Audubon Conservation Report No. 6, New York. 27 pages.

—Gene banks for higher animals. First International Conference on Research in Conservation Biology, University of California, La Jolla.

Doherty, James G. Animal management in Wild Asia. AAZPA 54th Annual Conference, Denver, Colorado. September.

Dolensek, Emil P. An epidemic of necrobacillosis in a herd of Thomson gazelles (with Raymond L. Napolitano and Elizabeth A. Russo). Annual Proceedings, American Association of Zoological Veterinarians.

Gold, Kenneth. Microscopy at the Osborn Labs. *Animal Kingdom*, 81(2):N6-N7.

—Particle accumulation by representatives of the genus *Tintinnopsis* (with Eleanor A. Morales). Abstract, *Journal of Protozoology*, 25(1):3.

—The accumulation and transport of minerals by marine protozoa. Second Annual Meeting at Brookhaven National Laboratory, 47-49.

Holmstrom, William F., Jr. Preliminary observations on prey herding in the matamata turtle, *Chelus fimbriatus* (Reptilia, Testudines, Chelidae). *Journal of Herpetologica*, 12(4):573.

Kallman, Klaus D. Functional brain transplants and their effect on sexual maturation in a teleost (with Martin P. Schreibman). Abstract, American Zoologist, 18:669.

—The genetic and endocrine control of sexual maturation in hybrids between *Xiphophorus helleri* and *X. maculatus* (with Isaac Y. Bao). Abstract, American Zoologist, 18:669.

—A sex-linked gene controlling the onset of sexual maturity in female and male platyfish (*Xiphophorus maculatus*), fecundity in females and adult size in males (with Valerie Borkoski). Genetics, 89:79-119.

King, F. Wayne. A new Bornean lizard of the genus *Harpesaurus*. Sarawak Museum Journal.

—Game preserve, pages 229-248. In Draft Regional Plan: A New Federal Capitol for Nigeria. International Planning Associates, Report No. 3, Lagos, Nigeria. 322 pages.

—Individual initiatives, pages 703-711. In Earthcare: Global Protection of Natural Area (ed. by E. A. Schofield). Westview Press, Boulder, Colorado. 838 pages.

LaBombardi, Vincent J. Isolation and characterization of fungal ferritin (with J. V. Klavins and M. A. Pisano). Abstract, Annual Meeting of American Society of Microbiologists, 330.

Mittermeier, Russell A. Kontrollierte Nutzung. Schildkroten—Lebensgrundlage für viele. Bild der Wissenschaft, 116-123.

—Distribution of the South American chelid turtle *Phrynops gibbus*, with observations on habitat and reproduction (with A. G. J. Rhodin, F. Medem, P. Soini, M. S. Hoogmoed, and N. C. de Espinoza). Herpetologica, 34 (L):94-100.

—Monkeys in the bank. International Wildlife, 8(2):36-40.

—Blood biochemistry and relations among *Podocnemis* turtles (with A. G. J. Rhodin and W. Frair). Journal of Comparative Biochemistry.

—Pa jagt efter *Kinosteron angustipons*, Centralamerikas sjældneste skilpadde (with A. G. J. Rhodin). Nordisk Herpetologisk Forening, 21(3):74-77.

—A brief survey of the primates of Coiba Island, Panama (with K. Milton). Primates, 18(4):931-936.

—South America's river turtles: saving them by use. Oryx, 14(3):222-230.

—Conservation status of the Callitrichidae in Brazilian Amazonia, Surinam, and French Guiana, pages 137-146. In The Biology and Conservation of the Callitrichidae (ed. by D. G. Kleiman). Smithsonian Institution, Washington, D. C.

—Tree-gouging, exudate-eating, and the "short-tusked" condition in *Callithrix* and *Cebuella*, pages 105-115. In The Biology and Conservation of the Callitrichidae (ed. by D. G. Kleiman). Smithsonian Institution, Washington, D. C.

—Callitrichids in Brazil and the Guianas: current conservation status and potential for biomedical research (with A. F.

Coimbra-Filho and M. G. M. van Roosmalen), pages 20-29. In Marmosets in Experimental Medicine (ed. by N. Gengozian and F. Deinhardt).

Napolitano, Raymond L. Serodiagnosis of aspergillosis in avian species (with Emil P. Dolensek and Elizabeth Russo). Annual Proceedings, American Association of Zoo Veterinarians.

—Reptilian amebiasis: current investigations (with Emil P. Dolensek). Society for the Study of Amphibians and Reptiles, 21st Annual Meeting.

Payne, Roger. Ethical questions of whaling. Information Report, Animal Welfare Institute, 27(2):5.

Ruggieri, George D. The healing sea (with Norman David Rosenberg). Dodd, Mead and Company, New York. 164 pages.

Schaller, George. Countdown for marsh deer. Animal Kingdom, 81(3):28-30.

—The lioness is a lousy mother. International Wildlife.

—A marsh-deer census in Mato Grosso (with J. Vasconcelos). Oryx.

—Rutting behavior of Pere David's deer (with Allegra Hamer). Zool. Garten. N.F., 48(1):1-15.

—Jaguar predation on capybara (with J. Vasconcelos). Z. Säugetierkunde.

Struhsaker, Thomas. Infanticide and social organization in the redtail monkey (*Cercopithecus ascanius schmidtii*) in the Kibale Forest, Uganda. Z. Tier-psych., 45:75-84.

Education

New York Zoological Park



Bronx Zoo education means direct contact with animals, whether it is feeding a llama in the Children's Zoo, or gathering on the lawn to examine an armadillo.

In 1978 the Department of Education developed twenty-one new courses, bringing to forty-four the programs which the department is advertising. The staff served 4,287 students in multi-session courses, 100 teachers in zoology workshops, and 1,670 adults in continuing education classes. The instructional staff was responsible for 22,213 student hours of teaching, an increase of 11 percent over 1977.

Zoo-visitor profiles have demonstrated that adults comprise the majority of zoo audiences. Therefore, the department has emphasized continuing education courses. The staff has developed popular offerings on the history of zoo medicine, animal behavior, zoo photography, and classes on zoo exhibition and design. Other new audiences include school populations of the gifted and the handicapped.

Concurrent with the development of adult course offerings has been the generation of revenue. In the past, all courses were essentially free of charge to all audiences. Fees have now been instituted for all adult offerings and most children's programs. This revenue will prevent fluctuation in quality and quantity of programming. Approximately \$50,000 was added to the department's operating budget from revenues generated.

Among the zoo community the Bronx Zoo has been a leader in environmental education programs. This year the department placed special emphasis on developing and evaluating a new curriculum and educational materials for "Project Windows on Wildlife." Under a grant from the Charles E. Culpeper Foundation, the staff developed a five-part supplement to the life sciences curriculum in grades four, five, and six; it focuses on the world's dwindling habitats and their animal populations.

The department expanded the popular summer Animal Kingdom Zoo Camp for eight-to-twelve-year-olds, with an increase in registration of 67 percent. This program, which is based on a zoogeographic theme, attracted 30 percent of its participants from Westchester County and 25 percent from Manhattan. The balance came from other boroughs, New Jersey, Long Island and Connecticut. A complementary program, Zoo Club, designed to encourage interest in wildlife and the environment in youngsters between the ages of eight and twelve, was developed.

Attendance at the Children's Zoo increased by 30 percent, to 300,000 visitors, approximately one out of every six Bronx Zoo visitors. A new self-guided tour for Children's Zoo visitors was developed and published in 1978. Children's Zoo programs, available hourly, ranged from animal demonstrations and origami to folk singing. The Charles Hayden Foundation awarded the Society a major grant toward the costs of creating a new Children's Zoo, which is planned to open in 1981.

Vital to the expansion of the Department of Education and its services has been the interest of a growing consortium of corporations and foundations. With their help, the department's staff has

increased three-fold since 1977, and contact-hours per student have increased from .75 in 1976 to 5.1 in 1978. Grants for operating and project purposes, in addition to those mentioned above, were received from the Avon Products Foundation, Inc., Champion International Corporation, Exxon Corporation, and the Helena Rubinstein Foundation.

The Friends of the Zoo, a corps of 100 persons who volunteer their services to the Zoo and its visitors, became part of the education department in 1978. The volunteers reached 11,781 schoolchildren at the Zoo through their regularly scheduled guided tours. In their outreach program, the Friends visited 3,752 individuals in hospitals, senior citizen homes, day-care centers, and schools for the handicapped. In addition to conducting tours, the Friends serve as information resources at sites throughout the Zoo.

New York Aquarium

The mandatory teacher-workshop programs have been so successful that institutions throughout the country have sought information on setting up similar projects. Ten programs were held at the Aquarium for 477 teachers. This brought the total number of teachers trained to over 3,000. Follow-up studies indicate that more than 105,000 students have reaped the rewards from this program. In addition, over 7,000 visitors of all ages took part in lecture programs, tours, and workshops, which encompassed such topics as endangered marine animals, resources of the sea, and inhabitants of the deep.

The Aquarium held its first summer camp for children, ages eight to twelve. Each session lasted three days, and the youngsters were introduced to basic concepts of the water world in order to increase their awareness and appreciation of the sea and the animals that make it their home. A summer teen program was also offered for the first time. The program included such diverse happenings as discussions with scientific staff of the Osborn Laboratories and a visit to the Fulton Fish Market.

Behind-the-scenes tours also were offered. Both avid and neophyte fish hobbyists met with tankmen and experienced the complex events necessary in the maintenance of aquatic creatures. More than ninety marine biology students were trained to work as docents, giving gallery talks and assisting with special events.



At the Children's Cove, young visitors touch, smell, and see the diversity of aquatic life.

Animal Kingdom Tours

The Zoological Society operates an international field education program through the Animal Kingdom Tours for members. In 1978, this program served 350 persons. Seven trips abroad were conducted during the year, to India, Nepal, Trinidad and Tobago, Galapagos and Peru, and East Africa. Two weekend tours were operated, one for whale watching off Cape Cod, and one to the Society's Wildlife Survival Center at St. Catherine's Island, Georgia. In addition, three day trips were arranged to wildlife sites in the New York area.

Each tour group was accompanied by curatorial staff, and the tours were always preceded by group briefing sessions and followed by group reunions. Graduate credit at Fordham University was once again available for travellers doing projects under the supervision of curatorial tour leaders.

Departments of Development and Membership

In the fiscal year ended December 31, 1978, the New York Zoological Society received contributions, bequests, pledges, and membership payments—all from the private sector—totaling \$4,900,000. The Society's development goals were pursued in six areas: individual membership; annual giving from individuals; annual giving from corporations; foundation support for operations and projects; the Animal Kingdom Fund; and grants from Federal government agencies.



Right, neither snow nor cold kept the Zoological Society's camels from the 1978 Annual Meeting. Above, inside Avery Fisher Hall, a ferret and friend welcome NYZS Members.



Membership enrollment stood at 12,071 at year's end, a 37 percent increase over enrollment at December 31, 1977. A total of 5,299 new members were acquired, and membership income from dues alone totaled \$365,000, an increase of 10 percent. Over 10 percent of the Society's members were enrolled in annual categories of \$100 a year or more. In combination with solicitation to increase the number of members in higher categories, the Society also created new \$12 associate membership categories in 1978. Among members recruited during the year, 2,678 were enrolled in these categories. The promotion of this program was aided substantially by the Consolidated Edison Company of New York, which mailed 2,800,000 membership brochures with its bills in October and November. The membership staff operated nine special events, ranging from the eighty-second annual meeting, attended by 3,500 members, to a "Breakfast at the Aquarium," attended by 1,100 persons.

Beyond membership dues, annual giving from individuals totaled \$374,000. Annual giving from corporations is the concern of the Society's Business Committee, co-chaired in 1978 by John Elliott, Jr., Chairman of Ogilvy & Mather International, and John Macomber, President of the Celanese Corporation. Under

their vigorous leadership, the Committee grew to thirty-eight members of the corporate community. The campaign raised \$272,000 from 209 corporate donors, an increase of 12 percent over 1977.

Foundations provided the Society with \$1,400,000 in project and operating support in 1978 (including restricted gifts deferred for 1979 expenditures). This represents an increase of 9 percent over foundation gifts in 1977.

The Animal Kingdom Fund is the Society's \$20,000,000 campaign to raise term endowment. Meant to strengthen the institution's financial reserve and also to provide capital for the creation of attendance-increasing and revenue-producing programs and facilities, the Fund grew to \$7,100,000 in 1978. Fifty-four Animal Kingdom Fund contributions totaling \$2,600,000 were received during the course of the year.

In 1978, the Osborn Laboratories of Marine Sciences received a grant of \$333,764 from the National Institutes of Health for a five-year research project studying the genetic control of sexual maturation in fish. The Society was awarded one additional Federal grant, in the amount of \$25,000, the maximum award in the new funding program of the Institute of Museum Services. Both field and laboratory research, curatorial training, and security programs continued with Federal funds awarded in prior years by the National Science Foundation, the Atomic Energy Commission, the U.S. Environmental Protection Agency, the National Endowment for the Arts, and the National Museum Act. New York State funding, in addition to that received through the Natural Heritage Trust and discussed in the Report of the Treasurer, was received from the New York State Council on the Arts for a performing arts program at Wild Asia's Dragon Theater.

Aside from membership events, the development office operated eighteen briefing sessions for donors and prospective donors at the Zoo and Aquarium, as well as in Manhattan and California. In San Francisco, John N. Irwin II, Howard Phipps, Jr., and Dr. Roger Payne made presentations describing the Society's international conservation programs. This preliminary effort to establish a national public relations and fund-raising campaign was advanced in the last quarter of 1978 by the creation of experimental national direct-mail and direct-response advertising campaigns. In executing this project, John Elliott, Jr., arranged for the contribution of the creative services of Ogilvy & Mather International and Ogilvy & Mather Direct Response.

Also, in 1978, the department developed the outline for a planned giving program and drafted an institutional policy statement with regard to the program. The Trustees voted at their December, 1978, meeting to adopt the program as outlined.

Under the chairmanship of Mrs. Harmon Rummel, the Women's Committee of the New York Zoological Society sponsored two small benefit parties in Manhattan in October and began planning a major benefit to be held at the Zoo in June, 1979.

Administrative Services

Department of Personnel

In 1978, fifty persons were employed as full-time employees. Among these were five individuals recruited to fill curatorial trainee positions, made available through Federal grants, in the Departments of Mammalogy and Ornithology, and at the Aquarium in animal care and the Department of Education. Four hundred and eighty-nine individuals were screened and placed as seasonal workers, mainly in visitor services and the education departments.

As in the past, the department investigated and utilized outside sources of funding for Society staffing. Through programs administered by the Comprehensive Employment and Training Act (CETA), Office for the Aging, Urban Corps, and Youth Employment, additional personnel were provided at no additional cost. Once again, through the CAPTURE Program of Christopher Columbus High School, handicapped Bronx youth were given an alternate to secondary education by working part-time at the Zoo. Numerous volunteers were placed in different departments to supplement the Society's labor force.

Department of Publications and Public Relations



Animal Kingdom magazine, published bi-monthly for members of sixteen zoological organizations, experienced a 36 percent increase in circulation in 1978.

Animal Kingdom magazine continued to grow in circulation with the addition of the Friends of the Burnet Park Zoo (Syracuse, New York), Zoo Hui (Friends of the Honolulu Zoo), Minnesota Zoological Society, and Seneca Zoological Society (Rochester, New York). The magazine is now sent to members of sixteen zoological organizations in North America, and nine regional editions are published. At December 31, 1978, the print order exceeded 76,000 copies. The growth of *Animal Kingdom* was aided by the generous support of the Andrew W. Mellon Foundation which gave a two-year grant for this effort in 1977.

Important articles published during the year included "A Different Kind of Captivity," by General Director William Conway, and the eyewitness account by Stefani I. Hewlett of the birth of a baby white whale at the Vancouver Aquarium. The October/November issue—a special edition, with an additional eight pages, devoted entirely to Alaska—was particularly well-received by readers.

In order to increase attendance at the Zoo, the public relations section of the department mounted an ambitious program of performers and special events. Every weekend from July through Labor Day, there were regularly scheduled appearances by dance and musical groups.

Wild Asia continued to receive publicity throughout the year, and, as usual, the pelican round-up in November was a media favorite. Sharks and the dolphin show were favorite press subjects at the Aquarium. In 1978, photographs of many Zoo animals proved especially popular. The gaur calf in Wild Asia, the Grevy zebra colts on the African Plains, the red spitting cobra in the Reptile House, and the douroucoulis, or owl monkeys, in the World of Darkness

appeared in newspapers from coast to coast. But far and away the favorite picture of the year was of the snow leopard cubs, Pete and Rose, who proved to be as newsworthy on the sports page as on page one.

Photographs for publicity and for *Animal Kingdom* were supplied by the photographic services section. In addition, films and slide shows were prepared for other departments of the Society. The sale of photographs to publishers continued to increase, as did demands for motion-picture footage of wildlife projects.

Visitor Services

Food and Souvenirs

In 1978, many improvements were made in services for visitors at the Zoo and Aquarium. Great emphasis was placed on the selection and training of part-time help whose work was much improved over prior years. Substantial increases in gross and net revenues were experienced. They are detailed in the Report of the Treasurer.

The Zoo Pub was extremely popular and enjoyed its highest sales in its three years of existence. Both the Pub and Zoo Terrace were equipped with new outdoor furniture and umbrellas, making for a more pleasant dining experience.

At the Zoo a program to upgrade animal-related souvenir merchandise was completed. As a result of this program, the Zoo experienced a significant increase in souvenir sales.

Admissions and Transportation

Nineteen seventy-eight was a year of change for the Department of Admissions and Transportation. New admission packages, in the Zoo's group sales effort and new "Zoo Pass" ticket sales programs, gave visitors the convenience of paying one price, with additional discounts. Credit cards were accepted at admission areas. Free-day donations were especially encouraging, increasing 80 percent over 1977 figures.

In 1978, 50 percent of the Zoo's visitors took advantage of one or more kinds of in-Zoo transportation. The addition of new Safari Tour stops increased ridership by 46 percent over 1977 and proved to be a popular convenience.

Operations



Adjacent to Wild Asia's festive plaza, construction proceeds on a new exhibition facility for tropical Asian animals.

During 1978, construction continued on two major exhibition projects at the Bronx Zoo: the 37,000-square-foot Wild Asia Jungle Building and Wolf Wood. Ground was broken for the indoor African mammal facility which will replace the Zoo's outdated Antelope House.

A large pool was constructed for the zebras in the African Plains, eliminating unsightly fences. A new drainage system for the Thomson gazelle area was also built in conjunction with this pool.

Another major project completed during the year was the rehabilitation of the animal commissary facility, including the installation of a new freezer unit. A souvenir stand was erected at the African Veldt, following the theme of existing structures in the area; another food stand was constructed for Visitor Services at the African Terrace; and two new Safari Tour stops were created.

The new gas line installed throughout the Zoo was placed in service in 1978, allowing natural gas fuel to be used in the winter for several buildings. Improved heating systems, bringing in fresh air, were installed in the yak building and nyala barn.

The World of Birds public areas were redecorated, with the painting of walls and ceilings and the resurfacing of the floors. Other work included the rehabilitation of the African Plains bridge, the Ostrich House portico, a food service kiosk, the Lion Island moat, and the installation of new pumps and boilers in the cafeteria and African lion house.

Security

The security department work in 1978 focused on further development of alarm systems for nighttime security. With partial funding from the National Endowment for the Arts, a four-camera closed-circuit television system was installed in the plaza and monorail area of Wild Asia. This system, monitored continuously from dusk to dawn, surveys an area that would otherwise require patrol by three security guards.

Another system, using photoelectric beams, was installed in the Zebra House in 1978. These two systems are part of a program begun in 1977 to augment the effectiveness of security personnel by using new surveillance technology and equipment. Thus, the department can maintain security in new exhibition areas without hiring additional personnel.

Report of the Treasurer

The programs of the New York Zoological Society, both operating and capital, cost \$14,030,310 in 1978. This figure embraces the operation of and capital improvements and additions at the Bronx Zoo, the New York Aquarium, the Osborn Laboratories of Marine Sciences, and the operation of the Society's international program in wildlife research and conservation. An operating deficit of \$28,900 was incurred during the year. Revenues available for operating purposes, including new exhibit construction and major renovation, increased 1% over the prior year. Expenditures decreased 4.5% during the same period. This decline in expenses resulted from the fact that 1977 expenditures included substantial costs in the completion of Wild Asia.

Revenues were received from four major sources in 1978. Governmental support increased 8.7% over amounts received in 1977, accounting for 33.5% of operating revenues. Government support totaled \$4,700,035: New York City contributed \$3,591,959 in funds and services; New York State, through the Natural Heritage Trust and the New York State Council on the Arts, \$970,384; and the Federal government, \$137,692.

In the past five years, government support has provided an average of 31.6% of expenditures; consequently, approximately 70% of expenditures have been met by income earned or raised by the Society. From 1974 through 1978, governmental revenues increased 18.8%, while programs and exhibits expenditures increased 28.7%. An ever-increasing demand for new avenues of self-support is clearly evident.

Admission revenues increased 7.2% and provided 11.0% of Society revenues. Gross sales from visitor services activities were up 18.4%, providing 23.6% of 1978 gross revenues and net revenues of approximately \$625,000 for improvements at the Zoological Park and Aquarium. Contributions and bequests for operating purposes accounted for 14.7%, and an additional \$184,000 was restricted for future uses. Investment income, excluding gains and losses on transactions, provided 5.5% of revenues. Remaining funds were provided by membership dues, *Animal Kingdom* magazine sales, and the sale of paintings held by the Society.

The Society, like most educational and cultural institutions, is a labor-intensive organization, and salaries and wages represented 45.2% of total expenditures, or \$6,341,551. This amounted to a 9.2% increase over 1977 expenses in this area, an increase reflecting general wage increments to staff and new personnel hired to fill positions in connection with projects supported by private foundations and corporations. Payroll taxes and employee benefits cost \$1,512,672, a decrease of 6.9% since the prior year.

Supplies and materials totaled \$1,306,379. Although the second most significant area of Society expenditure, this is only 9.3% of total expenditures. However, it is an area in which costs increased 23% over 1977, largely because of increased fuel oil prices.

In construction and animal purchases, the Society spent \$1,044,154 in 1978, including initial costs in connection with the new rare African mammal facility at the Zoo and the new shark tank at the Aquarium. In this area of expenditure, total costs decreased 61% as compared to 1977 because of the major Wild Asia expenditures in the prior year. The cost of goods sold was \$730,054; the costs of public relations, promotion, and advertising amounted to \$585,920, a modest 2.2% increase over 1977; the costs of food and forage for the animal collections were \$404,519, an increase of just 1% over 1977 because of sound diet selection and careful purchasing; in maintenance and repair, the Society spent \$394,137, a 11.7% increase over 1977. Other minor areas of expenditure included professional fees, publications, awards and grants, and general insurance.

The Animal Kingdom Fund's \$4,141,380 balance at December 31, 1978, does not include unpaid pledges, which aggregated \$2,810,000 at year-end. Animal Kingdom Fund monies totaling \$147,020 (\$49,419 in 1978) were utilized to fund projects.

John Pierrepont
Treasurer

PEAT, MARWICK, MITCHELL & CO.
CERTIFIED PUBLIC ACCOUNTANTS
345 PARK AVENUE
NEW YORK, NEW YORK 10022

The Board of Trustees
New York Zoological Society:

We have examined the balance sheet of New York Zoological Society as of December 31, 1978, and the related statements of operating support and revenue, expenditures and capital additions and changes in fund balances, of changes in financial position, and of functional expenditures for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

As explained in note 1 to the financial statements, expenditures for land, buildings and equipment are not capitalized, and depreciation of buildings and equipment is, therefore, not recorded. Such practices are not in accordance with generally accepted accounting principles.

In our opinion, except for the effect on the financial statements of the matter discussed in the preceding paragraph, the aforementioned financial statements present fairly the financial position of New York Zoological Society at December 31, 1978, and the results of its operations and the changes in its financial position for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

March 28, 1979

Peat, Marwick, Mitchell & Co.

New York Zoological Society Balance Sheet

December 31, 1978
with comparative figures for 1977

Assets	1978	1977	Liabilities and fund balances	1978	1977
		Operating funds			
Cash	\$ 815,560	1,003,501	Accounts payable and accrued expenses	\$ 868,164	1,225,449
Investment (note 2)	8,161,383	7,918,218	Deferred support and revenue—restricted (note 7)	5,137,146	4,366,458
Accounts receivable	621,011	460,686			
Grants receivable (note 3)	1,300,371	1,128,849		6,005,310	5,591,907
Inventories, at lower of cost or market	297,790	327,382	Fund balances:		
Prepaid expenses and deferred charges	377,032	366,452	Designated by Board of Trustees for long-term investment	5,501,065	5,282,029
			Undesignated	66,772	331,152
			Total fund balances	5,567,837	5,613,181
Total	\$11,573,137	11,205,088	Total	\$11,573,147	11,205,088
Endowment funds					
Cash	121,031	1,077,724	Fund balances:		
Note receivable	12,591	15,037	Endowment—Income unrestricted	2,282,156	2,370,102
Investments (note 2)	6,899,331	4,659,202	Endowment—Income restricted	609,417	846,143
				2,891,573	3,216,245
			Term endowment—Income unrestricted (note 5)	4,141,380	2,535,718
Total	\$ 7,032,953	5,751,963	Total	\$ 7,032,953	5,751,963

See accompanying notes to financial statements.

New York Zoological Society

Statement of Operating Support and Revenue, Expenditures and Capital Additions and Changes in Fund Balances

Year ended December 31, 1978

	Operating funds			Endowment funds	
	Unrestricted	Restricted	Total	Animal Kingdom	Other
Operating support and revenue:					
Contributions and bequests	\$ 631,092	1,421,580	2,052,672	—	—
Fees and grants from governmental agencies	—	4,700,035	4,700,035	—	—
Admission charges	—	1,538,976	1,538,976	—	—
Visitor services revenues (note 4)	200,000	3,103,733	3,303,733	—	—
Membership dues	365,088	—	365,088	—	—
Endowment and other investment income	628,259	146,565	774,824	—	—
Pension fund revenue	283,946	—	283,946	—	—
Proceeds from sale of assets other than investments	310,500	—	310,500	—	—
Miscellaneous revenue	472,139	150,052	622,191	—	—
Expiration of term endowment (note 5)	—	49,419	49,419	—	—
Total support and revenue excluding realized net losses on investment transactions	2,891,024	11,110,360	14,001,384	—	—
Operating expenditures:					
Program services:					
Zoological park and aquarium exhibits	14,730	6,989,641	7,004,371	—	—
Conservation and separately budgeted research	285,220	844,772	1,129,992	—	—
Educational activities	1,232,648	285,729	1,518,377	—	—
Visitor services and admissions	—	2,514,054	2,514,054	—	—
Membership activities	168,690	70,000	238,690	—	—
Total program services	1,701,288	10,704,196	12,405,484	—	—
Supporting services:					
Management and general	889,154	399,496	1,288,650	—	—
Fund raising	329,508	6,668	336,176	—	—
Total supporting services	1,218,662	406,164	1,624,826	—	—
Total expenditures	2,919,950	11,110,360	14,030,310	—	—
Excess of expenditures over operating support and revenue before realized net losses on investment transactions	(28,926)	—	(28,926)	—	—
Realized net losses on investment transactions	(226,418)	—	(226,418)	—	—
Excess of expenditures over operating support and revenue before capital additions	(255,344)	—	(255,344)	—	—
Capital additions:					
Contributions and bequests	—	—	—	1,681,012	4,366
Realized net losses on investments	—	—	—	(25,931)	(119,038)
Total capital additions	—	—	—	1,655,081	(114,672)
Excess (deficiency) of operating support and revenue over expenditures after capital additions	(255,344)	—	(255,344)	1,655,081	(114,672)
Fund balances at beginning of year	5,613,181	—	5,613,181	2,535,718	3,216,245
Other changes:					
Expiration of term endowment (note 5)	—	—	—	(49,419)	—
Reclassification of fund balance	210,000	—	210,000	—	(210,000)
Fund balances at end of year	\$ 5,567,837	—	5,567,837	4,141,380	2,891,573

See accompanying notes to financial statements.

New York Zoological Society

Statement of Changes in Financial Position

Year ended December 31, 1978

	Operating funds	Endowment funds
Resources provided:		
Excess of expenditures over operating support and revenue before capital additions	\$ (255,344)	—
Capital additions:		
Contributions and bequests	—	1,685,378
Realized net losses on investments	—	(144,969)
Excess (deficiency) of operating support and revenue over expenditures after capital additions	(255,344)	1,540,409
Additions which do not use resources—		
realized net losses on investment transactions	226,418	144,969
Decrease in note receivable	—	2,446
Decrease in inventories	29,592	—
Increase in deferred amounts	770,688	—
Proceeds from the sale of investments	3,322,021	3,874,098
Total resources provided	4,093,375	5,561,922
Resources used:		
Increase in grants receivable	171,522	—
Increase in accounts receivable	160,325	—
Increase in prepaid expenses and deferred charges	10,580	—
Decrease in accounts payable and accrued expenses	357,285	—
Purchase of investments	3,791,604	6,259,196
Total resources used	4,491,316	6,259,196
Other changes:		
Expiration of term endowment	—	(49,419)
Reclassification of fund balance	210,000	(210,000)
	210,000	(259,419)
Decrease in cash	\$ (187,941)	(956,693)

See accompanying notes to financial statements.

New York Zoological Society Statement of Functional Expenditures

Year ended December 31, 1978

Type of expenditures	Program services						Supporting services			
	Zoological park and aquarium exhibits	Conservation and separately budgeted research	Educational activities	Visitor services and admissions	Membership activities	Total	Management and general	Fund raising	Total	Total program and supporting services
Salaries and wages	\$3,512,291	454,481	428,798	1,208,880	55,567	5,660,017	552,603	128,931	681,534	6,341,551
Payroll taxes and employee benefits	885,772	111,432	102,248	229,533	11,603	1,340,588	143,235	28,849	172,084	1,512,672
Professional fees	59,644	18,900	21,816	14,745	10,049	125,154	175,355	93,526	268,881	394,035
Supplies and materials	877,347	116,981	59,625	178,521	18,632	1,251,106	45,919	9,354	55,273	1,306,379
Telephone and telegraph	9,004	10,746	1,747	70	7	21,574	101,959	1,876	103,835	125,409
Postage and shipping	2,313	4,118	2,660	4,734	17,670	31,495	17,353	4,079	21,432	52,927
Transportation/mileage	14,060	43,433	40,096	1,417	16,606	115,612	9,417	26,481	35,898	151,510
Research and collection expeditions	—	29,722	—	—	—	29,722	—	—	—	29,722
Conferences, conventions and meetings	—	—	—	—	—	—	16,102	—	16,102	16,102
General Insurance	—	—	4,965	123,401	—	128,366	115,596	—	115,596	243,962
Awards and grants	13,425	278,943	—	—	—	292,368	—	—	—	292,368
Subscriptions and reference publications	562	6,589	4,706	2,073	57	13,987	9,053	1,974	11,027	25,014
Public relations and promotion	6	13,082	489,753	770	73,427	577,038	386	8,496	8,882	585,920
Land, buildings, animals and equipment	1,044,154	—	—	—	—	1,044,154	—	—	—	1,044,154
Cost of goods sold	—	—	46,193	683,861	—	730,054	—	—	—	730,054
Repairs and maintenance	205,422	18,809	10,154	35,226	31,299	300,910	87,788	5,439	93,227	394,137
Food and forage	375,993	16,597	—	11,929	—	404,519	—	—	—	404,519
Publications	78	447	292,180	1,544	—	294,249	164	1,555	1,719	295,968
Other—miscellaneous	4,300	5,712	13,436	17,350	3,773	44,571	13,720	25,616	39,336	83,907
Total	\$7,004,371	1,129,992*	1,518,377	2,514,054	238,690	12,405,484	1,288,650	336,176	1,624,826	14,030,310

*Includes \$373,929 related to the operations of the Osborn Laboratories.

See accompanying notes to financial statements.

New York Zoological Society Notes to Financial Statements

December 31, 1978

(1) Summary of Significant Accounting Policies

The financial statements of the Society have been prepared on the accrual basis except for depreciation as explained below. The significant accounting policies are as follows:

Fund Accounting

In order to ensure observance of limitations and restrictions placed on the use of available resources, the accounts are maintained in accordance with the principles of fund accounting. This is the procedure by which resources for various purposes

are classified for accounting and reporting purposes into funds established according to their nature and purposes. Separate accounts are maintained for each fund; however, in the accompanying financial statements, funds that have similar characteristics have been combined into fund groups.

The assets, liabilities and fund balances of the Society are reported in two self-balancing fund groups:

Operating funds, which include unrestricted and restricted resources:

- Unrestricted funds represent the portion of operating funds available for the support of Society operations.
- Funds restricted by the donor, grantor, or other outside party for particular operating purposes (including accessions and other capital additions) are deemed to be earned and reported as revenues of the operating funds when the Society has incurred expenditures in compliance with the specific restrictions. Such amounts re-

ceived but not yet earned are reported as restricted deferred amounts.

Endowment funds, which include the following restricted resources:

- Funds that are subject to restrictions of gift instruments requiring in perpetuity that the principal be invested and only the income be used.
- Term endowment funds which must be held intact except that, at some future date or specified occurrence, some portion or all of the principal may be used (see note 5).

Plant Assets and Depreciation

Expenditures of operating funds for plant acquisitions including buildings and improvements constructed on land owned by the City of New York, are not capitalized, and accordingly depreciation is not recorded in the Society's financial statements.

Collections

Expenditures for collections are not capitalized.

Other Matters

All gains and losses arising from the sale, collection or other disposition of investments and other noncash assets are accounted for in the fund that owned the assets. Ordinary income from investments, receivables, and the like is accounted for in the fund owning the assets, except for income derived from investments of endowment funds, which is accounted for, if unrestricted, as revenue of the unrestricted operating fund or, if restricted, as deferred amounts until the terms of the restriction have been met.

Enforceable pledges for operating purposes, less an allowance for uncollectible amounts, are recorded as receivables in the year made. Pledges for support of current operations are recorded as operating fund support. Pledges for support of future operations are recorded as deferred amounts in the operating fund. Pledges to the Animal Kingdom Fund are recognized upon payment of the pledge.

(2) Investments

Investments are reflected at cost or fair market value at date of gift. The market value and cost of investments by fund were as follows at December 31, 1978:

	Market value	Carrying value
Operating funds—expendable	\$ 8,064,550	8,161,383
Endowment funds—nonexpendable	6,765,572	6,899,331
	<u>\$14,830,122</u>	<u>15,060,714</u>

Investments are composed of the following:

Short-term investments	2,086,000	2,086,000
Corporate stocks	7,308,979	7,015,295
Corporate bonds	2,197,218	2,453,759
U.S. Government obligations	<u>3,237,925</u>	<u>3,505,660</u>
	<u>\$14,830,122</u>	<u>15,060,714</u>

The following tabulation summarizes changes in relationships between carrying values and market values of investment assets:

	Market values	Carrying value	Net gains (losses)
End of year	\$14,830,122	15,060,714	(230,592)
Beginning of year	<u>12,309,128</u>	<u>12,577,420</u>	<u>(268,292)</u>
Unrealized net gains for the year			37,700
Realized net losses for the year			(403,063)
Total net losses for the year			<u>\$ (365,363)</u>

The average annual yield, exclusive of net gains, was 5.7%.

The New York State Not-for-Profit Corporation Law, which became effective on September 1, 1970, permits the use of realized gains on investment transactions of endowment funds. Such gains are currently being added to principal but may be utilized at the discretion of the Board of Trustees.

(3) Grants Receivable

Grants receivable of the operating funds represent amounts pledged to the Society for certain operations and for the completion of particular projects in future years. The grants are expected to be collected as expenditures for those projects made by the Society.

(4) Capital Projects Expenditures

The Society, in the construction of certain capital projects during 1974 and 1977, expended, in the aggregate, approximately \$1,800,000 in excess of funds restricted for such projects. The overexpenditures in the restricted operating funds have been financed by transfers of unrestricted funds. The transfer is being returned to the unrestricted funds from the net

income of the Skyride and the Monorail at the rate of \$200,000 per year through 1983 and \$100,000 per year through 1986. As of December 31, 1978, \$500,000 had been returned including \$200,000 in the current year.

(5) Term Endowment

During 1976, the Society initiated the Animal Kingdom Fund as a capital funds drive. The Fund was established as a term endowment fund to serve various functions—to provide revenue for animal operations, and to finance programs and improved facilities to produce revenue and increase attendance, as well as to provide the Society with a "survival" fund in the event that its other sources of revenue become insufficient to maintain the Society's programs. As a term endowment, the Fund is subject to the following conditions:

- (a) The income of the Animal Kingdom Fund shall be used for the general operating purposes of the Society; and
- (b) The principal of the Animal Kingdom Fund may be expended only upon the affirmative vote of two-

thirds of the Trustees present at any duly held meeting of the Board of Trustees or its Executive Committee (i) to finance programs or improvements to facilities (i.e., the Bronx Zoo, the New York Aquarium, or other facilities of the Society) to produce revenue or increase attendance, or (ii) to ensure the survival of the Society if funds from other sources fail to provide sufficient revenue to maintain the Society's programs; and, provided, however, that in the case of any contribution to the Animal Kingdom Fund which was subject to a restriction not to expend the principal of such contribution without the prior consent of the donor thereof, in addition to the vote of the Trustees described above, such consent must be obtained in writing prior to the expenditure of such principal. During 1978, the Society recognized in operating funds expired term endowments aggregating \$49,419.

Pledges to the Animal Kingdom Fund aggregating approximately \$2,810,000 are due to be collected as follows:

Year	Amount
1979	\$1,121,000
1980	820,000
1981	539,000
1982	275,000
1983	15,000
1984-1987	40,000

(6) Pension Plan

All eligible Society employees are members of the Cultural Institutions Retirement System's (CIRS) Pension Plan. Pension expense was approximately \$617,000, of which approximately \$317,000 was financed by an appropriation from the City of New York. The current year's provision includes amortization of prior service cost over a period of 30 years commencing June 30, 1974. The Society's policy is to fund pension cost accrued and no unfunded vested benefits existed as of June 30, 1978, the date of the latest plan valuation.

Certain employees of the Society were formerly participants in the Society's pension fund. Effective January 1, 1975, benefits of the CIRS Plan were substituted for benefits previously accrued under the Society's pension fund. The market value of the assets of the pension fund approximated \$1,600,000 as of December 31, 1978. These assets will be used to fund current pension costs and as yet undetermined past service costs relating to substitution of CIRS benefits for periods prior to

January 1, 1975. During 1978, \$284,000 was used for pension payments and is reflected as revenue and expense in operating funds. Based on preliminary estimates, it is the opinion of management that the assets of the pension fund will be sufficient to fund these past service costs.

(7) Deferred Restricted Support and Revenue

The changes in deferred support and revenue for the year ended December 31, 1978 are as follows:

Balances at beginning of year	\$ 4,366,458
Additions:	
Contributions and bequests	1,605,530
Fees and grants from governmental agencies	4,693,614
Admission charges and visitor services revenues	5,266,315
Investment income	230,461
Net loss on investment transactions	(31,676)
Other	116,804
	16,247,506
Deduction—funds expended during year	11,110,360
Balances at end of year	\$ 5,137,146

(8) Functional Allocation of Expenses

The costs of providing the various programs and other activities of the Society have been summarized on a functional basis in the statement of support and revenue, expenditures and capital additions and changes in fund balances. Accordingly, certain costs have been allocated among the programs and supporting services benefited.

(9) Collections

During 1978, accessions of collections aggregated \$32,020 while deaccessions aggregated \$15,977.

(10) Other

The Society is the ultimate beneficiary under a trust held by Community Funds, Inc. of New York, N.Y. The income arising from the investments of the principal is paid to the Society for restricted operating purposes.

The Board of Trustees at December 31, 1978

Officers

Laurance S. Rockefeller
Honorary Chairman of the Board
Howard Phipps, Jr.
President
Charles W. Nichols, Jr.
Chairman of the Executive Committee
Henry Clay Frick II
Vice President
Mrs. William Ward Foshay
Vice President
John Pierrepont
Treasurer
Frederick A. Melhado
Secretary
Harold C. Palmer
Assistant Secretary

Trustees

Alexander Aldrich
Mrs. Vincent Astor
George F. Baker, III
Guy F. Cary
John Elliott, Jr.

Mrs. William Ward Foshay
Henry Clay Frick II
Robert G. Goelet
Nixon Griffis
Gilbert M. Grosvenor
John N. Irwin II
Frank Y. Larkin
Dan W. Lufkin
John D. Macomber
Anthony D. Marshall
Otto Marx, Jr.
Frederick A. Melhado
G. W. Merck
Charles W. Nichols, Jr.
Augustus G. Paine
Richard T. Perkin
Howard Phipps, Jr.
John H. Phipps
John Pierrepont
Mrs. John L. Procope, Jr.
Eben W. Pyne
Laurance S. Rockefeller
Guy G. Rutherford
John T. Sargent
David T. Schiff

Chauncey D. Stillman
Judith C. Symonds
Landon K. Thorne, Jr.
Lila Acheson Wallace
Robert Winthrop

Ex-Officio Trustees

The Mayor, City of New York
The Commissioner, Cultural Affairs
The President, Borough of the Bronx
The President, Borough of Brooklyn

Board of Advisors

Robert E. Blum
James Walter Carter
Peter R. Gimbel
Peter Grimm
David Hunter McAlpin
Peter Matthiessen
Summer Pingree III
Mrs. Harmon L. R Emmel
John M. Schiff
Mrs. Joseph A. Thomas
Alice Tully
Mrs. Gerritt P. Van de Bovenkamp

Standing Committees of the Board of Trustees

Executive Committee

Charles W. Nichols, Jr., *Chairman*
Mrs. Vincent Astor
Mrs. William Ward Foshay
Henry Clay Frick II
Nixon Griffis
John N. Irwin II
Frank Y. Larkin
Frederick A. Melhado, *ex-officio*
Howard Phipps, Jr., *ex-officio*
John Pierrepont, *ex-officio*
Laurance S. Rockefeller
John T. Sargent
David T. Schiff

Auditing Committee

John Pierrepont, *Chairman*
Guy F. Cary
Frederick A. Melhado, *ex-officio*
Howard Phipps, Jr., *ex-officio*
David T. Schiff

Business Operations Committee

Dan W. Lufkin, *Chairman*
Frank Y. Larkin
Charles W. Nichols, Jr., *ex-officio*
Howard Phipps, Jr., *ex-officio*
John Pierrepont, *ex-officio*

Finance Committee

David T. Schiff, *Chairman*
George F. Baker, III
Guy F. Cary
Frederick A. Melhado
Howard Phipps, Jr., *ex-officio*
John Pierrepont, *ex-officio*

Nominating Committee

Augustus G. Paine, *Chairman*
Mrs. William Ward Foshay
Henry Clay Frick II
Frederick A. Melhado
Howard Phipps, Jr., *ex-officio*

Committees of the New York Zoological Society at December 31, 1978

Animal Kingdom Fund Committee

John N. Irwin II, *Chairman*
Mrs. Vincent Astor, *Vice-chairman*
John Pierrepont, *Vice-chairman*
John T. Sargent, *Vice-chairman*
John H. Adams
Alexander Aldrich

John D. Backe
George F. Baker, III
Edward Larabee Barnes
Leonard Bernstein
Robert E. Blum
John Cage
James Walter Carter

Guy F. Cary
John Chancellor
Craig Claiborne
Ramsey Clark
Judy Collins
William Conway
Edward N. Costikyan

George Crumb
 Joseph F. Cullman 3rd
 Stephen I. D'Agostino
 Philippe de Montebello
 Barbralee Diamonstein
 Rene Dubos
 John Elliott, Jr.
 Osborn Elliott
 Ralph Ellison
 Mrs. Charles W. Engelhard
 Amitai Etzioni
 C. Sims Farr
 Mrs. William Ward Foshay
 Henry Clay Frick II
 Brendan Gill
 Peter R. Gimbel
 Robert G. Goelert
 Harmon H. Goldstone
 Edward Gorey
 Nixon Griffis
 Tammy Grimes
 Peter Grimm
 Gilbert M. Grosvenor
 Bernhard Grzimek
 Thomas H. Guinzburg
 August Heckscher
 Andrew Heiskell
 Lillian Hellman
 Mrs. Ernest Hemingway
 Nat Hentoff
 Katharine Hepburn
 Jacob Javits
 Arnold P. Johnson
 Henry A. Kissinger
 Edward E. Klein
 Hilary Knight
 Frank Y. Larkin
 Joshua Lederberg
 Samuel J. Lefrak
 Roy Lichtenstein
 John V. Lindsay
 Royal Little
 Dan W. Lufkin
 John D. Macomber
 Peter Marler
 Alton G. Marshall
 Anthony D. Marshall
 William McChesney Martin, Jr.
 Otto Marx, Jr.
 Peter Matthiessen
 David Hunter McAlpin
 William J. McGill
 Harold W. McGraw
 Frederick A. Melhado
 G. W. Merck
 Daniel P. Moynihan
 Rupert Murdoch
 Louise Nevelson
 Charles W. Nichols, Jr.
 Augustus G. Paine
 William S. Paley
 Joseph Papp
 Roger S. Payne
 Richard T. Perkin
 Howard Phipps, Jr.
 John H. Phipps
 Harold Prince
 Mr. & Mrs. John L. Procope, Jr.
 Eben W. Pyne

Robert Rauschenberg
 Henry Hope Reed
 William K. Reilly
 Mrs. Harmon L. Remmel
 Laurance S. Rockefeller
 Julius Rudel
 Thomas R. Rudel
 George D. Ruggieri
 Guy G. Rutherford
 George Schaller
 Arlie Schardt
 David T. Schiff
 John M. Schiff
 Arthur Schlesinger, Jr.
 Richard J. Schwartz
 Irene Selznick
 Paul Simon
 Stephen Sondheim
 Elvis J. Stahr
 Mrs. A. H. Stevenson
 Chauncey D. Stillman
 Gardner D. Stout
 Judith C. Symonds
 Mrs. Joseph A. Thomas
 Landon K. Thorne, Jr.
 Russell E. Train
 Mrs. George L. Unis
 Mrs. Gerritt P. Van de Bovenkamp
 William vanden Heuvel
 Lila Acheson Wallace
 Mr. & Mrs. William H. Whyte
 Edward O. Wilson
 Robert Winthrop
 Mrs. Whitney Young, Jr.

Aquarium and Osborn Laboratories Planning Committee

Henry Clay Frick II., *Chairman*
 Peter R. Gimbel
 Nixon Griffis
 Richard T. Perkin
 Howard Phipps, Jr.
 John Pierrepont

Business Committee

John Elliott, Jr., *Co-chairman*
 John D. Macomber, *Co-chairman*
 Stuart K. Atha
 Bill Blass
 Guy F. Cary
 Edgar M. Cullman
 Joseph F. Cullman 3rd
 Stephen I. D'Agostino
 Paul W. Douglas
 A. Edwin Fein
 Andre Galerne
 Thomas H. Guinzburg
 Walter E. Hanson
 Arthur Hauspurg
 Edwin A. Heard
 John F. Hennessy, Jr.
 Jack R. Howard
 Eugene H. Kummel
 Dan W. Lufkin
 Alton G. Marshall
 Otto Marx, Jr.
 David B. McCall
 Donald F. McCullough
 William J. McNamara
 Frederick A. Melhado

John A. Millington
 Hiram F. Moody, Jr.
 John Pierrepont
 Mary Jane Pool
 Mrs. John L. Procope, Jr.
 Eben W. Pyne
 John T. Sargent
 Richard J. Schwartz
 Oakleigh B. Thorne
 Douglas P. Warwick
 Robert Winthrop

Conservation Committee

Frank Y. Larkin, *Chairman*
 Donald F. Bruning
 James Walter Carter
 William Conway
 Mrs. Edgar M. Cullman
 Allerton Cushman
 James G. Doherty
 Mrs. William Ward Foshay
 Henry Clay Frick II
 Robert G. Goelert
 Mrs. Philip D. Holden
 F. Wayne King
 Anthony D. Marshall
 John Mayer
 G. W. Merck
 Barclay Morrison
 Charles W. Nichols, Jr.
 Harold C. Palmer
 Roger S. Payne
 Howard Phipps, Jr.
 John H. Phipps
 Harmon L. Remmel
 George D. Ruggieri
 George B. Schaller
 Chauncey D. Stillman
 Thomas T. Struhsaker
 Landon K. Thorne, Jr.
 David Western

Development Committee

John Pierrepont, *Chairman*
 Mrs. Vincent Astor, *Vice-chairman*
 Guy F. Cary
 John Elliott, Jr.
 Mrs. William Ward Foshay
 Nixon Griffis
 John N. Irwin II
 Frank Y. Larkin
 John D. Macomber
 Frederick A. Melhado
 Howard Phipps, Jr.
 Mrs. John L. Procope, Jr.
 Laurance S. Rockefeller
 Judith C. Symonds

Editorial Committee

John T. Sargent, *Chairman*
 William Conway
 Gilbert M. Grosvenor
 F. Wayne King
 Peter Matthiessen
 George D. Ruggieri
 George B. Schaller
 Eugene J. Walter, Jr.

Education Committee

Judith C. Symonds, *Chairman*
Christopher Angell
Annette Berkovits
William Conway
Nixon Griffis
Mrs. John Guth
Karen Hensel
Frank Y. Larkin
Richard Lattis
Gregory Long
John McKew
Howard Phipps, Jr.
David A. Prager
Mrs. John L. Procope, Jr.
Arthur Ross
George D. Ruggieri
Edward Russell, Jr.
Mrs. John S. Samuels, III
John T. Sargent
Jenny Bell Whyte

Exploration and Collection Committee

Landon K. Thorne, Jr., *Chairman*
James Walter Carter
William Conway
Edwin Gould
Nixon Griffis
F. Wayne King
Frank Y. Larkin
Peter Matthiessen
G. W. Merck
Howard Phipps, Jr.
George D. Ruggieri

Women's Committee Board of Directors

Mrs. Harmon L. Remmel, *President*
Mrs. Chalmers Dale, *Vice-President*
Mrs. Driggs Hultkrans, *Vice-President*
Mrs. James F. Stebbins, *Vice-President*
Mrs. Joseph R. Siphon, *Secretary*
Mrs. Alexander Slater, *Treasurer*
Mrs. Norbert A. Bogdan
Mrs. Albert V. Casey

Lynn Chase
Mrs. Robert F. Fairchild
Mrs. William Ward Foshay
Mrs. Ridgely W. Harrison
Mrs. Ernest Horvath
Mrs. Jack R. Howard
Mrs. Hoyle C. Jones
Nina Mortellito
Mrs. John R. Preston
Mrs. Thomas L. Pulling
Mrs. Eben W. Pyne
Mrs. Thorburn Rand
Mrs. Tucker Ridder
Mrs. Joseph A. Thomas
Mrs. Franklin J. Wilkes
Mrs. Harper Woodward

Women's Committee Advisory Board

Mrs. Vincent Astor
Mrs. Charles W. Nichols, Jr.
Mrs. Landon K. Thorne, Jr.
Mrs. Anne H. Stevenson

Staff of the New York Zoological Society at December 31, 1978

William Conway, *General Director*;
John G. Hoare, *Comptroller*; John McKew, *Director of Administrative Services*;
Timothy F. O'Sullivan, *Deputy Director of Administration*; Gregory Long, *Deputy Director for Development and Membership*;
Marie Sexton, *Membership Chairman*;
Kathleen Wilson, *Grants Coordinator*;
Arnold Harlem, *Manager, Visitor Services*;
Barbara S. Friedman, *Accounting Manager*; Robert S. Kosturak, *Curator, Exhibits/Graphics*; Eugene J. Walter, Jr., *Editor & Curator, Publications & Public Relations*; Joan Van Haasteren, *Curator, Public Relations and Promotions*; William Meng, *Assistant Curator, Photographic Services*; James A. Oliver, *Director Emeritus*; William Bridges, *Curator of Publications Emeritus*.

Zoological Park

William Conway, *Director*; David Cole, *Deputy Director of Operations*; F. Wayne King, *Director of Zoology*; Joseph Bell, *Deputy Director of Zoology, and Chairman & Curator, Ornithology*; Donald F. Bruning, *Curator, Ornithology*; James G. Doherty, *Curator, Mammalogy*; Mark C. MacNamara, *Assistant Curator, Mammalogy*; John L. Behler, *Curator, Herpetology*; Richard Lattis, *Chairman & Associate Curator, Education*; Annette Berkovits, *Assistant Curator, Education*; Michael Gallo, *Manager, Security*; Joseph McCormick, *Manager, Transportation*; Charles B. Driscoll, *Director of Operations Emeritus*; Grace Davall, *Curator Emeritus*; Roland Lindemann, *Consultant, Mammal Management*; Jean Delacour,

Ostrom Enders, Winston Guest, Jr., Frank Y. Larkin, William K. Macy, Jr., S. Dillon Ripley, Charles Sivelle, Charles D. Webster, *Field Associates in Ornithology*; Joseph A. Davis, *Field Associate in Mammalogy*; William H. Zovickian, *Field Associate in Herpetology*

New York Aquarium

George D. Ruggieri, S.J., *Director*; U. Erich Friese, *Deputy Director*; Gordon Clark, *Manager, Operations*; Kenneth Gold, *Curator, Protista*; Klaus D. Kallman, *Curator, Fishes*; Paul Cheung, *Assistant Curator, Invertebrates*; Karen Hensel, *Curator, Education*

Osborn Laboratories of Marine Sciences

George D. Ruggieri, S.J., *Director & Experimental Embryologist*; Kenneth Gold, *Assistant Director & Marine Ecologist*; Ross F. Nigrelli, *Senior Scientist*; Paul J. Cheung, *Microbiologist*; Klaus D. Kallman, *Fish Geneticist*; Eli D. Goldsmith, *Scientific Consultant*; C. M. Breder, Jr., *Research Associate, Ichthyology*; Erwin J. Ernst, *Research Associate, Estuarine & Coastal Ecology*; Myron Jacobs, *Research Associate, Cetacean Neuroanatomy*; Martin P. Schreibmann, *Research Associate, Fish Endocrinology*

International Field Science and Conservation

Center for Field Biology and Conservation: George B. Schaller, *Research Zoologist & Coordinator*; Roger

S. Payne, Thomas T. Struhsaker, *Research Zoologists*; Donald F. Bruning, *Research Associate*

Department of Conservation: F. Wayne King, *Director of Conservation*; David Western, *Resource Ecologist*; Russell A. Mittermeier, *World Wildlife Fund Primate Ecologist*; Walter Auffenberg, *Federico Medem, Bernard Peyton, Stanley A. Temple, Conservation Fellows*; Cristina Palacio, *Staff Conservationist*

Wildlife Survival Center

John Lukas, *Assistant Curator in Residence*; Morton Silberman, *Clinical Consultant*; Donald F. Bruning, *Consultant, Ornithology*; James G. Doherty, Mark C. MacNamara, *Consultants, Mammalogy*; Emil P. Dolensek, *Consultant, Animal Health*

Animal Health

Emil P. Dolensek, *Veterinarian*; Elizabeth Russo, *Veterinary Resident*; Alan Belson, *Pathologist*; Consultants: Roy Bellhorn, *Ophthalmologist*; Robert Byck, *Pharmacologist*; John Budinger, *Pathologist*; Lucy Clausen, *Parasitologist*; Henry Clay Frick, II, *Obstetrician and Gynecologist*; Harold S. Goldman, *Radiologist*; Paul Henkind, *Ophthalmologist*; Theodore Kazimiroff, *Dentist*; Richard Lee, *Medical Internist*; Raymond Napolitano, *Microbiologist*; Jacques Wallach, *Clinical Pathologist*

Contributions, pledges, and payments on pledges of \$1,000 and over, January 1–December 31, 1978

ACF Foundation Inc.
Cornelius R. Agnew, Jr.
Douglas H. Alexander
Allied Chemical Foundation
American Can Company Foundation
American Express Foundation
American Re-Insurance Company
American-Standard Foundation
American Telephone and Telegraph Company
The Annenberg Fund, Inc.
The Arkville Erpf Fund Inc.
The Vincent Astor Foundation
H.L. Bache Foundation, Inc.
Mary Bader
The George F. Baker Trust
Bankers Trust Company
James M. & Margaret R. Barker Foundation
Beaumont Offset Corp.
The Frederick W. Beinecke Fund
The Siegfried and Josephine Bieber Foundation
Mrs. Harry Payne Bingham
John Blair & Co.
Samuel J. Bloomingdale Foundation, Inc.
Mr. & Mrs. Robert E. Blum
The Elmer & Mamdouha Bobst Foundation, Inc.
The Bodman Foundation
Borden Foundation, Inc.
The Albert C. Bostwick Foundation
Georgiana E. Brooks
Helen W. Buckner
Hon. & Mrs. William A.M. Burden
CPC International Inc.
Carolyn Foundation
Mr. & Mrs. Douglass Campbell
Capital Cities Communications, Inc.
Caravan Products Company Inc.
Carter Fund
James Walter Carter
Guy F. Cary
The Catto Foundation
Celanese Corporation
Dorothy Jordan Chadwick Fund
Champion International Corporation
The Chase Manhattan Bank, N.A.
Chemical Bank
Citibank, N.A.
Mrs. F. Ambrose Clark
Robert Sterling Clark Foundation, Inc.
The Clark Foundation
Coastal Dry Dock and Repair Corp.
Coney Island Enterprises Inc.
Consolidated Edison Company of New York, Inc.
Consumer's Carpet Workroom Co., Inc.
Ida Coppola
Louise B. & Edgar M. Cullman Foundation
Charles E. Culpeper Foundation, Inc.

Harry DeJur Foundation, Inc.
Margarita Victoria Delacorte Foundation
Alfonso DeMatteis
Leon D. DeMatteis & Sons Inc.
Deloitte Haskins & Sells
Cleveland H. Dodge Foundation, Inc.
Geraldine R. Dodge Foundation, Inc.
Incorporated
Dollar Savings Bank of New York
Doubleday & Company, Inc.
The Doris Duke Foundation
Dun & Bradstreet Companies Foundation, Inc.
The Dunlevy Milbank Foundation, Inc.
The Lincoln Ellsworth Foundation
Blanche T. Enders Trust
Engelhard Hanovia, Inc.
Mrs. Charles W. Engelhard, Jr.
The Charles Engelhard Foundation
The Eppley Foundation for Research, Inc.
The T.M. Evans Foundation
The Explorers Club
Exxon Corporation
John Clifford Folger
Foundation for Microbiology
Foundation for the Needs of Others, Inc.
Freeport Minerals Company
Dr. & Mrs. Henry Clay Frick II
Estate of Elizabeth F. Gamble
Louis Garguilo
Paul E. Geier
General Foods Corporation
Gilman Foundation Inc.
Bernard F. and Alva B. Gimbel Foundation, Inc.
Peter R. Gimbel
Mrs. D. Coleman Glover
Robert G. Goelet
Grace Foundation Inc.
The Griffis Foundation, Inc.
The Paul Guenther Fund
Raymond R. Guest
The Guinzburg Fund
Gulf + Western Foundation
Mr. & Mrs. Henry B. Guthrie
Enid A. Haupt
Charles Hayden Foundation
William Randolph Hearst Foundation
Henry B. Foundation
High Winds Fund, Inc.
Mrs. George L. Hinman
Audrey P. Holden Charitable Trust
International Business Machines Corporation
International Paper Company Foundation
International Telephone and Telegraph Corporation
The Irwin Family
John N. Irwin II
Johnson & Higgins
The Junior League of the City of New York, Inc.

Kings County Democratic County Committee
F.M. Kirby Foundation, Inc.
Robert J. Kleberg, Jr. and Helen C. Kleberg Foundation
James M. LaRossa
Lazard Frères & Co.
Lever Brothers Company Foundation, Inc.
LIN Broadcasting Corporation
The Lincoln Savings Bank
Royal Little
John Walton Livermore
The Joe and Emily Lowe Foundation, Inc.
Dan W. Lufkin
David Hunter McAlpin
Edith S. McBean
Estate of Fleur V. McCamish
McCann Erickson, Inc.
Mr. & Mrs. C. Richard MacGrath
John S. McIlhenry
John D. Macomber
Mrs. Hayward F. Manice
Manufacturers Hanover Foundation
Mr. & Mrs. Jan W. Mares
Townsend B. Martin
William McChesney Martin, Jr.
The Joseph Martinson Memorial Fund
Otto Marx, Jr.
Peter Matthiessen
Mayer Family Foundation
Helen S. Mayer Charitable Trust
Mrs. Ward Melville
Merck Family Fund
Mr. & Mrs. George W. Merck
Metropolitan Life Foundation
Morgan Guaranty Trust Company of New York Charitable Trust
Morgan Stanley Foundation
Barclay Morrison
Stuart Rawlings Mott
Muskiwinni Foundation
Newsweek
New York News - Joseph M. Patterson Charitable Foundation
New York Seven-Up Bottling Co., Inc.
New York Telephone Company
The New York Times Company Foundation, Inc.
Nichols Foundation, Inc.
Mrs. Charles W. Nichols, Jr.
Edward John Noble Foundation
North American Reinsurance Corporation
Jessie Smith Noyes Foundation, Inc.
Augustus C. Paine
Mrs. Marcel A. Palmaro
J.C. Penney, Inc.
The Perkin Fund
Pfizer Inc.
Philip Morris Incorporated
Phipps Florida Foundation
Howard Phipps Family Charitable Foundation

John H. Phipps
John Pierpont
Mary Jane Pool
Price Waterhouse & Co.
Mrs. John L. Procope, Jr.
The Prudential Foundation
Eben W. Pyne
RCA Corporation
Estate of Anne S. Rau
Reader's Digest Foundation
Rembrandt Fund
Revlon Foundation Inc.
Rockefeller Brothers Fund
Rockefeller Center, Inc.
Mrs. John D. Rockefeller 3rd
Laurance S. Rockefeller
Arthur Ross Foundation, Inc.
Helena Rubinstein Foundation, Inc.
The Rudin Foundation Inc.
George D. Ruggieri
The Kenneth Rush Foundation

Saks Fifth Avenue
John T. Sargent
The Scherman Foundation, Inc.
David T. Schiff
The Schiff Foundation
David Schwartz Foundation, Inc.
Richard J. Schwartz
Serres, Visone & Rice Inc.
Sirena Restaurant, Inc.
Estate of Annie Smithwick
Mrs. William Spencer
Sperry Rand Corporation
The Seth Sprague Educational and
Charitable Foundation
The Starr Foundation
The Stebbins Fund
Mrs. Roger W. Straus
Mrs. Arthur Hays Sulzberger
Texaco Inc.
The Thorne Foundation
The Oakleigh L. Thorne Foundation

Time Incorporated
The Fred C. Trump Foundation
Tudor Foundation, Inc.
Alice Tully
Union Carbide Corporation
Union Pacific Foundation
United Industrial Corporation
Universal Leaf Tobacco Co.
The G. Unger Vetlesen Foundation
Warner Communications Foundation, Inc.
Mr. & Mrs. Charles D. Webster
Whitehall Foundation, Inc.
John Hay Whitney
The H.W. Wilson Foundation Inc.
Mr. & Mrs. Robert W. Wilson Foundation
Robert Winthrop
Mrs. Alfred J. Yardley
The Yorkshire Fund
Nicholas D. Zigo
Three anonymous gifts

Gifts-in-kind of \$1,000 and over, January 1-December 31, 1978

Doubleday & Company, Inc.
Paris and Sidney Kiwitt
Ogilvy & Mather Direct Response, Inc.

Ogilvy & Mather International, Inc.
Howard Phipps, Jr.

Scali, McCabe, Sloves, Inc.
Roger Seasonwein Associates

Recommended Form of Bequest

The Trustees of the Society recommend that for estate planning purposes, members and friends consider the following language for use in their Wills:

"To the New York Zoological Society, a not-for-profit, tax-exempt membership organization incorporated by the laws of the State of New York in 1895, having as its principal address the New York Zoological Park, Bronx, New York 10460, I hereby give and bequeath _____
for the Society's general purposes."

If you want to restrict your bequest, please be in touch with Gregory Long of the Development Office, (212) 220-5090. In order to prevent the Society from incurring future administrative costs, it would be helpful if you would consider the addition of the following language to any restrictions which you may wish to impose on your bequest:

"If at some future time, in the judgment of the Trustees of the New York Zoological Society, it is no longer practicable to use the income or principal of this bequest for the purposes intended, the Trustees have the right to use the income or principal for whatever purpose they deem necessary and most closely in accord with the intent described herein."

Howard Phipps, Jr.
President

Back cover: On the back of a Bronx Zoo elephant, the imaginative visitor can ride to glorious battle with Kublai Khan, or lead a royal procession through the streets of Mysore, India.

Photo credits

page 20: William Conway

page 25: Kenneth Gold

back cover and pages 11 and 39:

Christopher Maune; page 27:

George Schaller. All other photographs by Bill Meng and Dennis DeMello, staff photographers.

Set in Linotron 202 Century Schoolbook and Helvetica Black by Expertype, Inc. New York, and printed on Centura and Kromekote papers. Designed and printed by the Department of Exhibits/Graphics, New York Zoological Society.





